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Management Services, Management Training and the Manager

Professor L. A. GUNN

The following is the text of a speech by Professor Lewis Gunn, Professor of Administration at the Civil Service College and at Strathclyde University. It was delivered at the opening of the National Health Service (NHS) Management Services Workshop held at the Manchester Business School in April 1976. Senior representatives of the 3,000 Management Services officers currently employed by the NHS attended to discuss the longer-term organization and philosophy of management services in the NHS. —*Editor.*

I welcome this opportunity to meet representatives of management services. For some time I have been concerned about the lack of communication between management teaching and services. I have also had a more general concern about the relationships which all of us (management teaching and management services) have with the manager-client. Tonight I shall begin by talking briefly about these relationships, then go on to open the discussion of how we might improve them.

First, then, the relationship between management teaching (at least in the universities) and management services. I find a good deal of ignorance about management services among my academic colleagues; and, to the extent that they have opinions, a certain amount of scepticism. Some typical academic responses can be briefly described:

(1) Management services are seen as still advocating 'principles' of management, while academics tend to favour 'contingency theory' (i.e. every statement about management theory must begin with the words: 'it all depends . . .') and to distrust any universal principles.

(2) More generally, management services look for solutions (cures) while academics like to think of themselves as seeking understanding (diagnosis); and a few social scientists, it must be said, seem to have semi-theological objections to being useful.

(3) In decision-making, management services tend to emphasize the search for 'rationality', while many academics are questioning conventional ideas of rationality and some are influenced by the ideas of Charles Lindblom ('the science of muddling through', with its emphasis upon participation, consensus-seeking and incre-

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mentalism—upon limits to the feasibility and desirability of imposed change, in other words). Herbert Simon, as the father of 'the new science of management decision', is now a rather unfashionable figure in academic circles.

(4) Above all, management services are seen by many academics as still concentrating on 'techniques' at a time when there is considerable doubt and controversy about the assumptions underlying techniques and larger approaches such as management by objectives, organizational development, planning-programming-budgeting systems, cost-benefit analysis, management information systems, etc.

Let me make it clear that I am reporting these observations to you and not necessarily endorsing them. No doubt academic perceptions of modern management services are out of touch and out of date; but they exist none the less and, if these stereotypes are to be broken down, action will be needed on the part of management services as well as management teachers.

It would be interesting to know what impressions you have of much of the teaching and research on management that goes on within the universities. Is the academic approach to management theory and sciences too abstract, too behavioural, too negative, too value-laden or ideologically biased? It would be interesting to have your comments and observations. But the general point that I am trying to make is that we (management services and teaching) do not know enough about one another and this ignorance allows some strange and not very sympathetic stereotypes to grow unchallenged.

Now let us move on to the second relationship, that between the manager-client and all those who seek to affect the way in which he does his job—management services and consultants, management teachers and trainers. Is the relationship a satisfactory one, based upon mutual esteem, trust and acceptance? Speaking as an academic and an administrative trainer, my answer is 'No'. And I would be surprised if you never experienced a doubt about your own relationship with managers in the NHS (although I know that you have the great advantage of first-hand managerial experience and a continuing role as managers in your own right).

From speaking to civil servants, local government officers and NHS administrators, I get the impression that they have a sceptical view of management sciences and management experts. Again, here are some typical points of view:

(1) Management sciences are not truly 'scientific', if only because they deal with human beings whose behaviour cannot be predicted or reduced to scientific laws. This criticism is most often made by managers who are also 'professional men'—clinicians, scientists, engineers, etc.

(2) The only relevant expertise is that gained on the job, from practica

knowledge of its constraints and complexities. Analogies drawn from other settings will be false analogies (especially if taken from private industry). General principles do not apply to our particular case and so on. Typically, this is the criticism of the manager whose experience has been severely practical and often confined to one type of setting.

(3) In the end, anything important to management-in-government is settled politically—either by Ministers (party politics), as in the case of budgetary outcomes; or by administrative politicking, both intra- and inter-agency, as in the case of management reviews. To the extent that management sciences have any impact, it is at the lower levels of management; at higher administrative levels, the advice of management experts can be excluded, or their findings ignored, or only their 'acceptable' findings adopted (usually to legitimize what the agency heads wanted to do anyway). This criticism is made by many administrators and with total conviction by Administration Trainees who have just spent several weeks in their Minister's private office and, therefore, have the key to all human knowledge.

(4) Above all, the management techniques are seen as a 'box of tricks' of very mixed value to the manager. Many of them do not appear to work as intended or else they create as many problems as they solve. The 'flavour of the month' approach has meant that busy managers have been asked to try techniques and approaches which owe more to fashion than to proven usefulness.

The resistance to techniques has been particularly marked among many of the managers to whom I have been speaking in the past year or two. It has also been finding its way into print. A good example is Professor J. D. Stewart's recent book, *The Responsive Local Authority*, in which he reports on local government reactions:

> There is now an element of disappointment (with management techniques), which could easily turn into disillusionment. The achievements of management techniques have not been as great as hoped; their impact on the actual process of management has often been peripheral. Many appear more talked about than used, and where used it has been for occasional exercises, rather than as part of the normal process of management.

Local government's scepticism can be seen at first hand in several recent articles and statements by councillors and officials, such as an article with the title 'Have Management Techniques been Oversold?' which appeared in *Local Government Chronicle* (14th February 1975) and called for a 'cost-benefit analysis' of techniques such as cost-benefit analysis, corporate planning, MbO, job evaluation, OR, network analysis, work study, internal audit and management accounting.

Most topically of all, let me refer you to an article in the April 1976 issue of *Management Today*, viz. John Argenti on 'Whatever Happened to Management Techniques?' In 1966, at the height of the 'managerial

revolution', this journal published a Guide to Management Techniques which sold some 25,000 reprints. But, says Argenti, 1976 is not 1966. The attitude of business managers to management techniques is now one of 'boredom, cynicism, scepticism—contempt even'. He offers four possible explanations of the failure of management techniques to make their expected impact:

(1) British managers are ignorant layabouts. . . . (A thoughtful silence may be appropriate at this point.)

(2) Some techniques have been oversold and many are too sophisticated for easy adoption by busy managers. As Argenti suggests: 'It is right and proper for academics and consultants to be well ahead of the practising manager . . . (but not) to be so far ahead as to be out of sight.'

(3) The past decade has not provided an atmosphere suited to experimentation or innovation in management techniques, because of uncertainty, instability and, most recently, scarce resources.

(4) The political and economic situation has imposed its own brutal realities in terms of trade union power and resistance to innovation, and raging inflation which can make nonsense of the most sophisticated planning, information and control systems.

Argenti concludes: 'This has been the decade when we all came down to earth with a bump . . . gone are the Cloud Seven techniques . . . gone are the experts in the esoteric . . . gone are the specialists in the specious . . . gone are the management gurus, back to their dark inner shrines.' You may feel that some of these extreme statements tell us more about the speakers than about management science. But we must not be too dismissive, since the larger swing of opinion is too clear and too consistent to be ignored.

The criticism of management scientists that worries me most is one of the least frequently or explicitly expressed. It is that we do not have enough hard information about the content and characteristics of the managerial job and the basic activities and processes which make up management. This thought has often occurred to me, especially when talking about management-in-government. The only thing that comforts me is that managers themselves find it very difficult to give any coherent answer to the question: 'What do managers actually *do*?' But if managers can function without asking themselves such basic questions, the same is not necessarily true of management services and management teaching. Without some way of conceptualizing and classifying managerial activities and problems, we shall find it difficult to get 'inside' management or to integrate our contributions to on-going managerial processes. Again, I find myself echoing J. D. Stewart when he writes: 'The problem is how to integrate (management) techniques into the processes of management'.

You have heard that I am a member of the Thwaites Working Party on the Training Needs of Senior Managers in the NHS. My main contribution has been an opening chapter entitled: 'A Commentary on Management and Management Training.' This chapter poses a number of questions relevant to our discussion tonight and I want to raise three of them with you.

Question 1: Who are (and who are not) 'managers'?

In a sense, everyone is a manager who takes responsibility for managing his own time and determining his own priorities. A more specific criterion, however, is the extent to which he is responsible for managing resources other than his own energies. Several resource-categories are obvious—manpower, finance and plant. But others are less obvious or tangible. For example, information can be regarded as a resource to which the manager can add: he must, in any case, store, classify and be able to retrieve information and avoid its loss or leakage. Even less tangible are power and influence, but these are also organizational resources which are finite and capable of being squandered or of being effectively and sparingly used. An associated concept is that of reputation as a resource to be deployed, including both personal and organizational reputations. Finally, some would argue that organization (including operating procedures) is itself a resource and that managers should take responsibility for the design and adaptation of their organizational unit or sub-unit.

To summarize this approach to the question 'Who are the managers?' we can say that, in any given organization, the title should be reserved for those employees who deploy the resources of the organization. What managers 'manage' are human, financial, physical and informational resources, and they have some impact upon the organization's good name and the use made of its power and influence. They also affect the structure and operations of the organization itself.

On applying such criteria to the staff of a medical organization, we may find that some staff who call themselves managers scarcely merit the title while others who have never thought of themselves in that way are actually playing very important managerial roles. One problem of management services in the NHS is presumably that many 'managers in white coats' first need to be convinced that they are managers at all.

Question 2: What do managers actually do?

When I was first asked, almost ten years ago, to share in planning and teaching courses for health service managers (including clinicians), I tried to find out something about the nature and content of various management jobs in the NHS. But the answers I got were hopelessly vague and several colleagues and I resorted to asking a tiny sample of clinicians and managers to keep 'diaries'. In a few cases we were able to supplement this managerial self-recording by direct observation and activity-sampling. Astonishingly, no one appears to have done the

same for a statistically valid sample of managers within the reorganized health system. There is no real equivalent in the British public sector to the studies of managers' jobs which have been done for the private sector by writers such as Rosemary Stewart (Britain) and Henry Mintzberg (USA).

The most recent of these business studies—Mintzberg's *The Nature of Managerial Work* (1974)—is at a sufficiently high level of generality to seem of interest to students of management-in-government as well. He argues that, far from being systematic planners who delegate routine tasks, most senior managers tend to react to the stimuli of events and contacts and do little long-term thinking about objectives, alternatives and strategy. Among the real-life (and often very time-consuming) roles of the manager are some which might appear trivial and are rarely mentioned in the management literature.

One such role is imposed by the very fact that the senior manager is taken to represent the organization (or his part of the organization): this is the *figurehead* role as expressed in presentations to retiring employees, receptions for distinguished visitors and other symbolic activities of varying importance. Some aspects of the *leader* role are equally unsought and may even be unconscious: thus subordinates assume encouragement or rebuke from the reactions of senior managers even when no such messages are intended. The *liaison* role is one in which the manager 'makes contacts outside his vertical chain of command', contacts both internal and external to the organization. These three roles are described by Mintzberg as 'interpersonal roles': they derive from the status bestowed upon senior managers and need not be desired or deliberately assumed roles.

Three other roles are categorized as 'informational'. Briefly, they involve the *monitor* role, the *disseminator* role and the *spokesman* role. Because of his liaison role, the senior manager is at the centre of many information flows. In processing, filtering, passing on and initiating information, the manager is performing a function vital to his organization.

Finally, in Mintzberg's analysis, there are four 'decisional' roles. As *entrepreneur*, the manager identifies problems and opportunities and acts to change and improve the circumstances of his organization. In the *disburbance-handler* role, on the other hand, he is dealing with pressures to which he must react although they are often beyond his control (pressures from government, say, or from a powerful group). A third decisional role is that of *resource-allocator*, involving decisions about, say, who shall have access to computer-time, or where staffing cutbacks should fall most severely. This role gives the manager fairly direct influence over many key decisions, and a lever to achieve organizational control and co-ordination. Finally, since few managers are able to impose their decisions unilaterally in modern circumstances, he must play the *negotiator* role.

The contribution made by Mintzberg and other modern writers is

that they tell us what managers actually do rather than what managers believe they do. Such realism is the basis of any useful thought about training for management—and about services for management? Thus Mintzberg argues that classical management theory often ignores skills which the manager actually needs—such as developing 'peer relationships' with his counterparts in other organizations, or carrying out negotiations, or establishing information networks, or making decisions in conditions of extreme ambiguity or under severe time-pressures.

Question 3: What functions ought managers to perform?
At this point we move from description to prescription. From Mintzberg's account of how managers actually spend their time, it is clear that certain activities traditionally thought to be central to management—such as planning and co-ordinating—appear to be neglected or at least given low priority in practice. The same point was made by Rosemary Stewart in her 1967 study *Managers and Their Jobs*. Both these observers conclude their analyses with some prescriptions for improvement in the ways that managers perceive and perform their jobs. Thus, to respond to day-to-day stimuli in a reactive manner may be to neglect the proactive, initiating, planning, objective-setting tasks of management. To seek refuge in 'busyness' may be to avoid uncomfortable questions about 'effectiveness'. To rely on informal information flows and on a personal memory-bank for information storage and retrieval may be easier, but also more dangerous, than to set up a more formal 'management information system'. To rely on experience and intuition to form judgements may be to deny the contributions which can be made by subject specialists and management experts.

Speaking personally, I think we must identify more clearly the functions and processes we believe essential to the effective performance of the management role. Then we must help managers to strengthen these functions and processes, where they appear to be inadequately emphasized or performed. My view of the functions to which managers should give thought and effort is fairly conventional, as follows: decision-making and planning; innovating and change-management; controlling; organizing; leading and motivating; managing personnel; administering finance; information-handling and communication. Having identified the basic functions, the next task is to specify the particular processes involved in each. Only then will we be in a position to identify the skills and services required by managers.

Let me illustrate my argument with one or two examples. First, the function of 'planning'. This would seem to involve the following processes:

(1) Problem-search and problem-definition (needs analysis, social indicators, etc).
(2) Forecasting (*expected* futures, possible and probable).
(3) Objective-setting (statement of *desired* future).

(4) Identification and appraisal of options (including cost-effectiveness and cost-benefit analysis, etc).
(5) Policy-definition and programme-design (including networking techniques).
(6) Policy-implementation and programme-execution.
(7) Monitoring, control and evaluation (every programme-manager should be able to answer the questions, 'What are we trying to do?' and 'How will we know when we've done it?').

This model of planning can, of course, be made very elaborate indeed, but the aim should be to understand the basic processes involved in this managerial function in order to understand better the skills which training should inculcate (in this case, those of 'policy analysis') and the assistance which management services can provide.

Time permits of only one more example, namely, the function of 'innovating and change-management'. A preliminary distinction can be made between the processes of 'planning *for* change' and 'planning *of* change', where change is externally and internally generated respectively. In both cases, thought must be given to appropriate organizational forms, appropriate procedures, and appropriate attitudes and behaviour. In the case of planning *for* change, for example, the search for appropriate organizational forms is likely to lead us to the 'organic' forms suggested by Burns and Stalker. Or managers who are responsible for the planning *of* change should understand the possible contribution that 'OD' (organizational development) insights may offer to overcoming attitudes of resistance to change.

The details are not important at this stage. What is important, in my view, is to understand the functions of management, then the processes and activities involved in each function, and finally the methods, techniques and approaches appropriate to each process.

Conclusions

At the beginning of this talk I referred to the uneasy relationships existing between management teaching and management services, and between both and the manager-client. I tried to indicate that the management services are too often equated with management techniques in the eyes of both academics and managers, and that the current atmosphere is hostile to the 'box of tricks' approach—however unfair that label may be to you.

I have indicated my own belief that there is some fundamental work to be done in identifying the essential management functions and the processes involved in each. This is work in which management teachers and management services might combine to some extent. For example, we might attempt a study of the actual content and characteristics of various types of managerial jobs in the reorganized NHS. If certain functions and processes appear to be under-emphasized or inadequately performed, we should embark with the managers themselves upon a

study of how these might be strengthened. Last and also least, we should turn to the contribution of specialized methods and techniques to improving the performance of these processes and functions.

The emphasis upon managerial functions and processes has recently been increased in Civil Service training. From organizing ourselves around the single-disciplinary inputs of economics, statistics, psychology, etc, we have been re-grouping around such functional concepts as policy analysis, organizational analysis, personnel management and the changing environment of government. The results are already beginning to be seen, I hope, in the clients' view of the relevance of these academic offerings.

It may be that there is a clue here to the possible regrouping of the management services. The natural tendencies are, first, to insist rather defensively upon the unity and inseparability of the management services, and second, to sub-divide these services internally along disciplinary lines. However, the most relevant organizing principle for the management services might be to regroup them in inter-disciplinary teams and to integrate these more directly with particular management functions.

No doubt there are more interesting questions to which you will be addressing yourself in the course of this workshop. But I am very glad to have been asked to open your proceedings and I hope that they will lead to great things.

Training Management Advisers

M. DONCASTER, Civil Service Department

Mike Doncaster, who is on loan from the Department of the Environment, is a lecturer at the Civil Service College (Specialized Training Wing) and is particularly concerned with management adviser training. The author wishes to acknowledge the contribution made by other members of the team mentioned in the article in the preparation of the article that follows. —*Editor.*

> As a grown man, you should know better than to go around advising people.
> Bertolt Brecht (*Mother Courage*)

Introduction

Originally management adviser training by the Civil Service College (STW) was designed specifically for management development advisers engaged on MbO projects. Recently the Wing has been experimenting with a new design of adviser course aimed at a much wider category of management adviser, including most types of internal consultants.

While the first adviser courses concentrated on the procedural elements common to most departmental approaches to MbO, later

courses began to introduce more learning of the skills necessary to do the adviser's job. Over the last two or three years, as Departments have begun to experience problems of implementation with the traditional MbO approach, it has become increasingly clear that the systems introduced would have to differ both between and within Departments. This was clarified recently by the guidelines for Improving Management Systems agreed by the Joint Committee on Management Services (published in the May 1976 edition of *MSIG*).

The implication of these guidelines for central training of advisers is that it is no longer possible to teach one package of formal elements. The common features in all departmental approaches are the basic consultancy skills required by the advisers. These skills are the same as those used by other advisory management services. Recently, worries have been expressed over the rate of acceptance and implementation of reports by such MS officers. Training has been devised in techniques for gaining such acceptance, but little attention has been paid to skills training. This being the case it seemed sensible to mount a course in basic consultancy skills for all types of internal consultants; and it is hoped that this article, which describes the design, planning and running of such a course, will not only be of interest, but will stimulate some discussion of the conclusions drawn.

The opportunity to mount a course arose at the beginning of this year. At that time demand for what had been advertised as a traditional type of adviser course was sufficient to warrant running the one scheduled for February/March 1976. It was decided to take up this opportunity and radically revise the adviser course. Consultation with the main clients who were nominating officers for the course produced agreement that the focus should be on skills rather than procedures.

Consultations with people, both in the College and outside, who were involved in either consultancy work or training in skills led to consideration of a variety of possibilities as to the content and means to be employed. It became clear, however, that the experience of both appropriate consultancy work and appropriate training methods could only be provided by a mixed team drawn from inside and outside the Civil Service.

Discussion with Management Services (General) Division of CSD led to an approach to the other prospective members and a team evolved. John Barker, from CSD, the author and his group director from the Specialized Training Wing could provide knowledge and experience of current consultancy work in the Service; Dr. Nick Georgiades and Brian Wilkinson of the Department of Occupational Psychology, Birkbeck College, and Jenny Blake of the Tavistock Institute could provide knowledge and experience of both consultancy work and training in consultancy skills.

Course design

We met several times to plan the course, and these were exciting,

confused and sometimes painful meetings. The step forward toward a new approach, a step partly into the unknown, gave rise to a need to have a clear agreed plan for the course. This was difficult to achieve in view of our acceptance of certain assumptions about the learning process. These are basically that:

(*a*) One cannot teach—people can choose to learn.
(*b*) Learning is sometimes a painful process.
(*c*) Learning is unique and individual.
(*d*) The learner is the key resource.
(*e*) Learning results from experience.

Experience-based learning can be described as a cyclic process which continually recurs (see *Figure 1*).

THE LEARNING (EXPERIENTIAL) MODEL

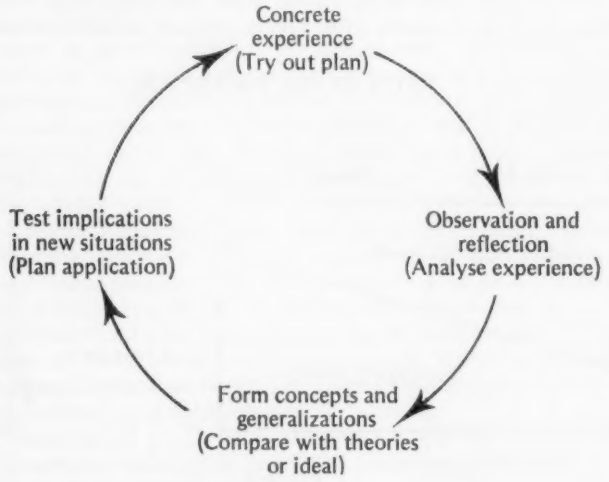
Concrete experience (Try out plan)
Observation and reflection (Analyse experience)
Form concepts and generalizations (Compare with theories or ideal)
Test implications in new situations (Plan application)

Figure 1

This led to consideration of our key resources—the course members. A lot of general data were known about their situations—the tasks they would be performing, the organizational needs surrounding those tasks, the background and some of the problems they would face. These were varied. In addition, it could confidently be assumed that individual levels of knowledge and skills would vary as would personal needs and problems.

A common element, however, was the fact that they would be in advisory roles. Again we were in agreement as to the nature of an effective advisory process. It was defined as a process where the client

is helped to solve his own problem, in which he does not become dependent on the consultant. This can be achieved by generating valid data about the problem thus offering the client options for informed choice—leading to commitment for the implementation of the course of action chosen. It is a process of developing independence and autonomy in the client. For the advisers to learn this process it would be necessary for them to experience it—the teacher/learner relationship should mirror the consultant/client relationship.

It followed from the above assumptions and models that the course should be learner-centred rather than problem-centred, and that a detailed timetable could not be fixed in advance. Instead a general plan of the content became clearer. Initially the emphasis would be on examining life and career perspectives and working in the first week on the development of personal awareness and greater interpersonal competence. The second week would allow further development and also focus on technical skills and knowledge relevant to the demands of the learners' jobs. *Figure 2* illustrates this overall pattern.

PATTERN FOR THE COURSE

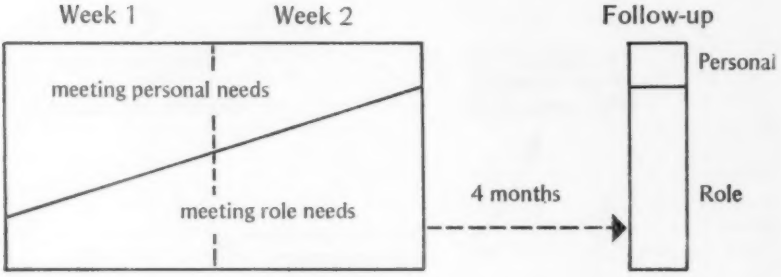

Figure 2

In addition there was commitment to provide means to assist the application of learning to practical work situations. The course should end with the development of individual plans of action, and the opportunity of post-course follow-up or support provided to review their implementation.

The expectations, hopes and fears of the team aroused by their view of the course were that:

(*a*) There would be an assumption that there are answers and the tutors should know most of them.
(*b*) If the tutors acted as experts the learners would become dependent; if the tutors refused the learners would become anxious.

(*c*) The learners would avoid things close to them; they would want to 'stay in their heads' (think not feel).
(*d*) The learners would worry about being pushed into situations that they could not control.

Clarifying and agreeing the basic ideas about the pattern of the course took up most of the planning time. Detail was carefully avoided, the course director being told 'Don't worry, it'll be all right on the day'. Some practical constraints did affect the planning, however. The problem was to balance the need for intensive tutelage, the availability of team members during the two-week period, the different skills in the team, and the limited financial resources. The solution was that two members of the team would have complete responsibility for the first week, two others for most of the second week, and the author would help link the two, provide additional contributions and guide the application of learning to the job demands.

The course itself

There were to be 12 members on this course. The first task in our learner-centred approach was to find out more about them. A questionnaire was used to discover task objectives, personal and organizational strengths and weaknesses, and hopes and fears about the course. They were contacted about the joining arrangements and provided with reading material, some humorous, some serious, to stimulate thinking about the advisory role.

It was realized that the start of the course itself, like the entry phase in consultancy work, would be an uncomfortable and anxious period. First came the expressions of frustration at the lack of a timetable, and thus lack of sound knowledge on which to base expectations. The tutors explained the reasons for this, the models and assumptions underlying the design of the course and made explicit their hopes, fears and expectations. Course members also shared their hopes and fears and a learning contract was established.

The other initial problems that were worked through in this first phase concerned learning in artificial situations, politeness, avoiding rather than confronting issues, in groups.

A life and career goal planning exercise was used as the main theme of the first week, for which the members were put into two groups, interspersed with exercises to develop specific skills, with short talks and discussions to clarify issues that were arising. The skills included listening, counselling, helping and giving and receiving feedback.

Both individual and group work (the latter either in the life/career groups or smaller groups) was undertaken together with periods when the whole course met and shared views.

One further structure was introduced midway through the first week when the two main groups were asked to split into pairs. The purpose was to form a helping relationship whereby each partner set goals for himself each day to develop skills in some specific manner. At the end

of the day he would receive feedback from his partner on his performance and be helped to set goals for the following day. These helping relationships were to remain throughout the rest of the course.

An interesting phenomenon was the difference in pace of development of the two main groups, reflecting the different needs and problems of the individuals within them. This was to have more impact during the second week.

Problems at this stage centred around the realization of differences between career aspirations and job requirements. In addition to being a comment on the selection procedures this also reflected the prevailing image of a management adviser (in the MbO situation in particular) as a purveyor of procedures and techniques rather than as a consultant with wide opportunities and challenges open to him.

The style of the tutors during the first period illustrated the consultancy approach, but was in addition very supportive and helpful in linking course experiences to aspects of the members' job situations.

In order to keep in touch with what learning was taking place, and the current state of development in each individual, members were asked at the end of the week to provide details as to what they had learnt and what had been the most helpful and least helpful aspects.

The first problem encountered in the second week was the changeover of tutors. Whilst it was useful for members to see different consultancy styles in practice, it did mean that there needed to be a readjustment period while the learning contract was renewed. In contrast to the first week the tutors adopted a 'process-consultant' role initially, only intervening to bring out points about what was going on in the groups and not becoming involved in the tasks the groups were doing. Members found this difficult at first until they realized that it gave them an opportunity to decide for themselves how best to spend their time in satisfying their own differing needs.

The two main groups continued to develop at different speeds. This caused intergroup conflict which allowed members to practise skills such as negotiation, and conflict resolution. It also helped to highlight group processes, especially ways in which groups develop.

During the week members decided who, from a list of available speakers, they wished to call upon, and how they wished to use the time available. This is not easy for speakers: they cannot prepare too far in advance and in some cases will not be sure of what is expected of them until they arrive. These sessions varied from traditional lectures followed by discussion with the whole course to both groups using the speaker in different ways. A particular speaker was asked by one group to act as a consultant helping them with a particular group problem and by the other group to discuss different consultancy approaches. In each case the other group observed by means of CCTV.

As the week developed the tutors began to change their roles to provide input of a more conceptional and theoretical nature. At the

request of the groups short lectures were given either to the course as a whole or to small groups; subjects covered included motivation and resistance to change.

Part of the last two days was spent by members looking at their own individual work situation or problem, using various analytical techniques such as force-field analysis, and drawing up action plans for themselves with the help both of other course members and of the tutors. This was to provide the link back to their job situation and to help members put into practice the skills they had learned during the course.

Review of the course

Once again members were asked to provide written comments on their learning and views of the course, although the course was also briefly reviewed during a discussion on the final afternoon. For the tutors' part the course had been an exciting new venture that had also been a learning experience for them as well as the members. Those from the College had been involved in a new approach to training management advisers that seemed so much more appropriate and effective than previous approaches.

The fairest way, however, to give a view on the course is to describe the reactions of the members, or let them speak for themselves. Several disliked the learner-centred approach, particularly at the start (although some of these appreciated the value by the end of the course). One went so far as to say, 'I have found the course probably the most frustrating two weeks I have experienced. The style was so completely new and unexpected—admittedly it was down in the course syllabus, but not in language which, at that time, I understood'. The more generally held view as expressed by one person, was that, 'I like this new approach to learning, i.e. learning to ride the bicycle, learning from my own mistakes. At times this was difficult to handle and indeed it was a traumatic experience'.

Most members recorded that they had gained greater knowledge and understanding of the consultancy process, and recognized the parallel between that and the training process. As one put it 'a greater awareness of your own and the other person's reactions to inter-personal and group situations is essential if you are to be an effective consultant', and many comments reflected this type of awareness. There was also reflected a greater insight as to the need for and nature of other skills required by a consultant. Many members realized that the course was a starting point in this area, a base from which progress could be made—'I feel that I have been given a psychological uplift. I did not expect to acquire skills that will be of such great value to me in *life* (including my job as a consultant but much more)—I am excited that I have started to learn such skills'.

By the time this article is published the next stage of the course will have been held. This is the two-day meeting, scheduled for mid-July,

where the implementation of action plans will be reviewed. Although the reactions during and at the end of the course indicate some sort of training success, the transfer of benefit to the practical work situation is our real criterion. Expectations are not optimistic but we are hoping for some greater indication of benefit than has been evident from past courses. (Should any readers be interested in finding out what happened at the follow-up I shall be happy to discuss it.)

The team's own learning from this course has brought out the following points to be pursued in planning future courses:

(*a*) More integration between the client systems and the training activity is required. Only through closer working will the difficulties of differences between career aspiration and the needs of the job be overcome.

(*b*) This course was non-residential. The main effect was to restrict the pace at which learning proceeded. A residential course would allow more development within the two-week period.

(*c*) The changeover of tutors mid-way through the course provided an unnatural break; more continuity is desirable although the value of having tutors who practise different consultancy styles should not be lost.

(*d*) Experiential learning depends for its effectiveness on skilful processing of the activities by the tutors. This demand, together with the anxiety or stress induced by the unstructured nature of the approach, creates a need for a high tutor/learner ratio.

(*e*) Too many members from one organization, who, therefore, face similar problems in their jobs, can create a dominating factor which upsets the attempt to focus equally on each individual's needs and problems.

Conclusions

So far this article has covered the aspects design, planning and execution of a specific management adviser course held in March of this year, together with ideas for amendments in the future. There are, as mentioned earlier, some wider conclusions that can be drawn with correspondingly wider implications for both training and consultancy.

One implication for training arises out of the general appreciation by members of the learner-centred approach. This reinforces misgivings held by the team as to the continuing use in many areas of the trainer-centred approach. In this the learning needs of the whole target population are assumed to be similar, and to be known by the training expert; both the methods by which and pace at which learning is hoped to take place are predetermined in detail. Yet it is possible, as in this case, to study and get to know the varying job requirements, to work in co-operation with appropriate managers in the client organizations, to find out where learners are in terms of present knowledge, skills and needs, to start from individual positions and move at individual paces. In many places approaches of this kind are being

tried, and it will be interesting to know more about the problems and successes associated with them. One factor that stands out as being essential is to have clear and explicit aims and guidelines (i.e. basic assumptions and models) within which to be flexible and able to focus on the individual.

On the subject of consultancy, several implications strike home. First, although there is a widespread acceptance that 90 per cent of management services work involves dealing with people a vast amount of training is geared to teaching techniques, procedures and technical knowledge. Thus there is a question of imbalance as to where training efforts are directed. Secondly, there is the idea mentioned at the beginning of this article that some similar consultancy skills are required by a wide variety of MS officers. On this particular course there were not only management advisers in MbO, or participative management assignments, but also O and M officers and an OR specialist. All found the course relevant to their job needs but the relative value of these skills to different specialisms may vary.

Lastly there are the implications for consultancy work stemming from acceptance or rejection of the model of the process given in an earlier paragraph. The comments of a course member express better than I can the reasons for favouring a process of helping clients to solve their own problems rather than putting the consultancy effort into providing expert solutions:

> My eyes have been opened to the professionalism of consultancy in a way that previous reading and discussion have never achieved. I have felt much previous dissatisfaction with the role and strove to get out of this type of work to resume a line-management career—primarily, I guess now, to shelve responsibility for extremely poor responses and 'solutions' the system often achieved *for* our client. In fact, to be frank, I have often been disgusted with the lip-service paid to the autonomy of our client but have felt helpless in the situation. I now feel very happy with the possibility of continuing in consultancy. . . .

These will not be the only, nor necessarily the most important, implications people will see. We hope that readers will be willing to communicate their comments or conclusions, if not through the medium of this journal, at least by contacting the author or other team members personally. The ensuing exchange of ideas and experiences could help all involved to develop knowledge in both the particular area of training internal consultants and possibly more general aspects of training. This knowledge is important because it assists the training contribution to the objectives of the organization. Approaches such as the one described, which encourage and help people to develop their own resources more fully, are vital in helping the organization attain a better use of its human assets.

Job Appraisal Reviews Three Years On

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Introduction

In 1970–71 the Civil Service introduced a new appraisal interview scheme as part of the 'better personnel management' procedures that evolved out of the Fulton Report. These interviews were called 'Job Appraisal Reviews' (JARs) to emphasize the fact that it was job performance rather than personality that was to be appraised. Although departments differed in the speed with which they introduced JARs, the scheme has now been operating in many of them for up to three or four years and is a fairly well established and familiar aspect of personnel management. So, it is an appropriate moment to take stock of how the JAR system is working, and two recent evaluation studies afford an opportunity to do this.

Evaluation of JARs has been an on-going process from the early days of the scheme, and one of the first studies to be done was reported in this journal three years ago.[1] Since then numerous other studies have been carried out, some by BSRD and some by departments themselves in collaboration with BSRD; the results of these investigations are dealt with at length in a recent book.[2] This article will confine itself to presenting the main findings of the two most recent evaluations to be carried out, one in Her Majesty's Stationery Office (HMSO) and one in the Property Services Agency (PSA) of the Department of the Environment. These two studies between them provide a chance to answer such questions as whether there is any evidence of improvements in manager–subordinate communications brought about by the introduction of JARs; whether the interviews are subject to a law of 'diminishing returns', with successive JARs given over the years being less useful; and what factors contribute to successful appraisal interviews.

The HMSO survey was carried out in two stages, the first before JARs were introduced and the second after they had been running for

[1]'An Evaluation Study of Job Appraisal Reviews' by C. A. Fletcher. *MSIG* Volume 28, Number 4, November 1973.

[2]'Staff Appraisal and Development' by E. Anstey, C. A. Fletcher and J. Walker. Published by Allen and Unwin, London (1976).

about three years. The former concentrated on general attitudes and experiences concerning work, supervision and communications with management, while the latter presented some of the same questions again (to see if there had been any change) as well as fresh items concerning the JARs given and the participants' views on them. A total of nearly 500 questionnaires were sent out in each of the two stages, covering matched samples of staff from CO up to and including SEO level (and its equivalent in the technical grades). In the PSA survey, questionnaires were sent to just over 800 potential appraisees and to over 200 officers in appraising grades. Some of those responding to the Appraisee questionnaire had not been given a JAR for one reason or another, and they completed a shortened form of the questionnaire. The questions asked in the forms centred on the JAR itself, and how it had been conducted and what it had achieved. The grades covered in the PSA sample ranged from CA–HEO and PTO IV–PPTO as appraisees, and from HEO–Principal and PTO I–Superintending Grade as appraisers. In both HMSO and PSA a very high response rate was achieved, no doubt aided by the full co-operation given by the departmental Staff Sides.

The results will be discussed in respect to three main areas—the content and style of the interviews, what they achieved and their effectiveness over time. In view of the limited space available only the main findings can be sketched in here.

The interview

Topics covered

In both departments the interviews most frequently lasted between a half and one hour, though a sizeable proportion of them went on over an hour. During that time the central topic for discussion appears, naturally enough, to have been the job—how it had been performed and what problems had arisen from it. However, many interviewers are clearly reluctant to tackle the weaker areas of the individual's performance during the JAR, only 46 per cent doing so in PSA. Rather more, 56 per cent, gave recognition in the appraisal of work done well. The corresponding figures for HMSO were very similar, and in this respect the findings from the two departments are typical of those emerging from evaluation studies done elsewhere. It does appear (from the PSA data) that the individual's level of performance influenced the likelihood of his receiving praise or criticism in the JAR, with those who had rather lower report markings being more likely to receive unfavourable feedback on their performance. It could thus be argued that what discussion of performance did take place was to some extent aimed at those who most needed it. Unfortunately, in a few interviews (14 per cent) the appraiser neglected to balance his more critical comments with some recognition of work done well or relatively well by the individual.

Promotion and training were also raised frequently and, while it is

certainly desirable that training needs be reviewed, the discussion of promotion markings can very easily lead to misunderstandings, and appraisers are not recommended to raise this topic of their own accord.

Style of the interview

The interviews were perceived as being very much two-way exchanges, the majority of both appraisers and appraisees saying that they talked and listened for about equal amounts of time during the session. Only a small proportion of the appraising officers said they experienced any major difficulties in carrying out the JARs, and judging by their subordinates' descriptions of the way the interviews were conducted, they adopted a mainly participative, problem-solving style. This involved listening attentively to their interviewees when they were talking, giving them ample opportunity to put their views forward and pressing them to give their own ideas and suggestions about the job. The interviewers generally appear to have conveyed the impression that any points of disagreement were quite open to discussion.

A particularly favourable observation on the PSA findings is that when job difficulties were discussed the problem-solving process was seen to be a joint exercise by the majority (69 per cent) of appraisees; indeed 20 per cent of them said they provided most of the solutions to problems themselves, which is a rather higher proportion of cases than has been observed in other departments (where the tendency has been for interviewers to do too much spoon-feeding in this respect).

Effectiveness of JARs

Many of the questions in the two studies focused on measuring the effectiveness of the scheme and on attempting to identify features which could lead to increased effectiveness in the future. Appraisees' attitudes to JARs were investigated and a number of criteria of effectiveness were used including the number of action points to emerge from the interview; increases in appraisees' job satisfaction and perceived improvements in work performance that had arisen out of the last JAR. It should be emphasized here that the reported benefits of the interviews are mostly based on the subjective assessments of the participants. Thus, there were, for example, no objective measures available against which appraisees' claims of improvements in job performance could be confirmed. However, a degree of double-checking was made possible in this instance by also seeking the views of the appraisers as to whether the JARs had brought about any changes in their subordinates' work performance. In addition, appraisers' general assessment of effectiveness were investigated in both studies and are worth reporting in view of their wide experience in holding these interviews.

Appraisers' views

The large majority of appraisers felt that they themselves had derived much benefit from the exercise, which had been particularly useful in

two specific areas. Almost half the appraisers in HMSO found that some JARs they had conducted had made them aware of staff problems about which they had not previously known, while a small majority had discovered problems related to the work itself—e.g. lack of clear job definition, too heavy or too light workload—for the first time in the interview. The equivalent figures for PSA appraisers also reflected that, for a sizeable proportion, JARs provided useful information for their line-management task. Taking the two departments together, more than two-thirds of the appraisers thought that the JAR had led to an improvement in the job performance of some or all of their appraisees. In view of these results it is, perhaps, not surprising that a large majority of appraisers in both departments (88 per cent in PSA; 79 per cent in HMSO) were favourably disposed to JARs overall, while hardly anyone in either department was actually against the scheme. This favourability was common to appraisers in both administration and P & TO groups.

Appraisees' views

A high proportion of appraisees in both surveys (71 per cent in PSA; 70 per cent in HMSO) also had a favourable overall opinion of the scheme, although the figures were not quite as high as for appraisers. Some of the reasons for these widespread favourable opinions are dealt with below.

At the end of each interview appraisers and appraisees should agree jointly on action which is required, both from the appraisee himself and from other interested parties—e.g. the line manager, PS division—on how he can best develop himself and improve his work performance. The interviews in HMSO appeared to be very productive in this respect, with two-thirds of them giving rise to firm action points. However, many useful things can be discussed and achieved in a JAR without any action recommendation having to be recorded; more important than the *number* of action points is that where action is really necessary and noted as such, it is actually taken whenever possible. Appraisees in HMSO were asked about this and a substantial majority reported that action had been taken on some or all points raised at their most recent JAR. Only 15 per cent claimed that no action had been taken.

The ultimate aim of JARs is, by letting people know where they stand, to bring about an improvement in job performance and job satisfaction; in these respects results from both surveys suggest that the scheme has been reasonably successful. (Reference will be made later to 'letting people know where they stand'.) One half of the appraisees in both departments thought that their last JAR had led to an improvement in their work performance or an increase in their job satisfaction, or both. Two out of five appraisees perceived an (in most cases, slight) improvement in their work performance and almost as many reported an increase in job satisfaction. Hardly anybody felt that their per-

formance had actually deteriorated as a result of their last JAR although one officer in every twenty in both departments thought that their job satisfaction had decreased. This was probably inevitable since some people may well have had expectations which were too high, whilst it was probably necessary to tell others a few home truths.

Some factors influencing effectiveness

Although one could not have expected JARs to have led to improvements in everybody's satisfaction and performance, some findings from the two studies suggest that the interview could be more widely effective. Some relevant evidence came from the HMSO study where the questionnaire responses from those appraisees who had reported an improvement in (i) work performance and (ii) job satisfaction were compared with the responses of those who had reported no improvement. In effect, this was making a comparison between more effective and less effective interviews and attempting to find what factors are associated with this difference. Reported improvements in work performance attributable to JARs were found to be associated with:

(1) The amount of time spent preparing for the interview—those appraisees spending a reasonable time are much more likely to report an improvement.
(2) Use of the interview preparation form.
(3) Discussion of poor performance, ideas for improving work methods and training needs in the interview.
(4) Whether or not action points came out of the interview.
(5) The number of points on which action is taken—those reporting that action had been taken on some or all points were much more likely to report an improvement.
(6) Receipt of the agreed Action Sheet by appraisees.

Perceived improvements in work performance were found to be strongly correlated with increases in job satisfaction. Sixty per cent of those reporting an improvement in performance also experienced an increase in satisfaction while only 18 per cent of those who reported 'no improvement' did experience increased satisfaction. It is, therefore, not surprising that most of the factors just noted were similarly associated with increased satisfaction, along with some other features of the interviews which had a significant influence in raising job satisfaction specifically. These included the opportunity to talk freely in the interview, the frankness of the appraiser (as judged by the appraisee) and discussion of the subordinate's future aspirations.

It is not the case that these features of the JAR, if present, will guarantee a successful interview any more than their absence necessarily means an interview is doomed to failure. Much depends on the skill of the appraising officer. Nevertheless, these factors do seem to contribute to the likelihood of success, and the single most important of them that has emerged from every evaluation study so far carried out

is the discussion of the individual's strengths and weaknesses in performance. In order to investigate this further, the PSA sample was divided into groups—those who had discussed both strengths and weaknesses, those who had discussed neither and those who had discussed one topic but not the other. It was found that when interviewers discussed strengths and weaknesses the JARs appeared to be most effective. When the opinions of appraisees in this group were compared to those in the other groups, more of them were in favour of JARs, more of them felt the JAR had increased their job satisfaction and more of them thought their performance had improved as a result of the interview. In contrast, the interviewers who avoided talking with the appraisees about their strengths and weaknesses were the least successful. It should not be inferred from this that the appraisees who had discussed strengths and weaknesses had authoritarian managers who just told their subordinates what they thought of them—on the contrary, more of the appraisers of this group were seen as having a consultative style of management than was the case for the other groups.

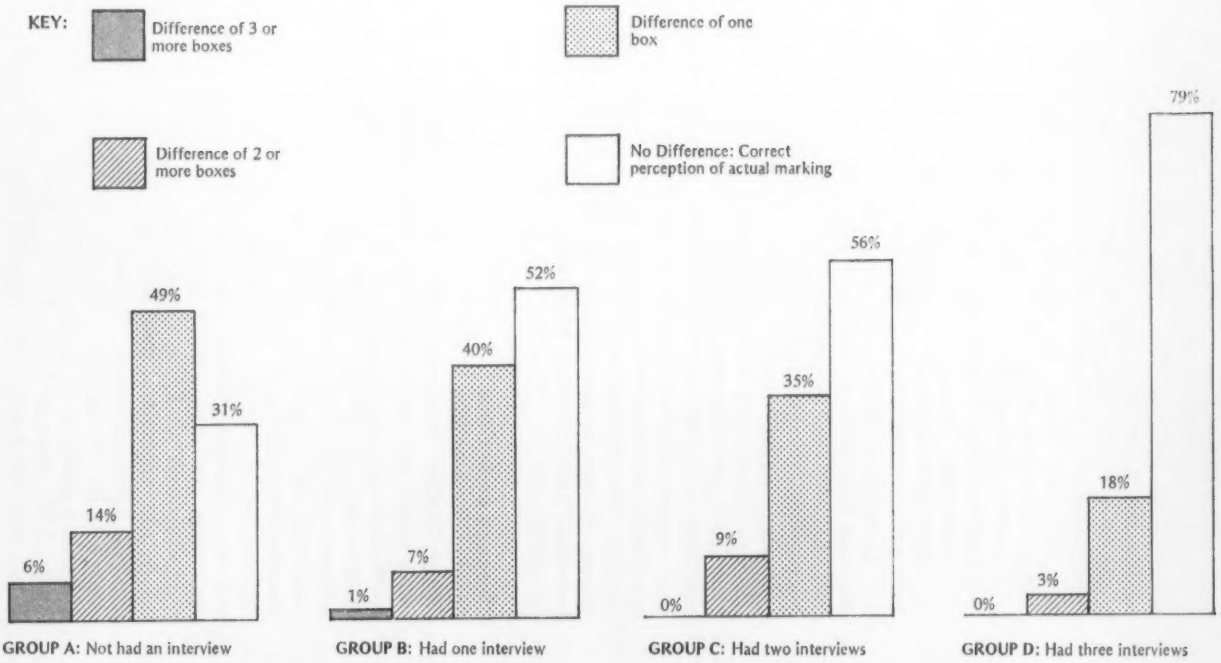
Finally, one other feature which appears to influence JAR effectiveness was investigated in the PSA study; this is the frequency of normal Appraiser–Appraisee communication in the job. Previous studies had indicated that JARs are most effective where good manager–subordinate communication already exists. This was expected, since the appraisal is intended to supplement rather than to supplant day-to-day contacts. The PSA research showed that without doubt appraisers who seldom discuss the work outside the JAR achieve much less with their interviews than do those who more frequently talk over the job with their staff.

Changes over time

Increased communication

In the HMSO 'before-and-after' study, a matched sample of officers were asked the same questions about communications with their immediate supervisors and with their managers as three years before, prior to the introduction of JARs. In the interim they had all received between one and four interviews. The changes which were found were consistent with those one would have expected to result from the introduction of JARs, although, of course, any such investigation cannot demonstrate a causal relationship. JARs were designed partly to increase communication between appraisers (usually the manager) and appraisees, and this desired outcome was attained in HMSO. The results showed that there was now significantly more discussion between managers and their staff, and that staff now felt much more free to talk to their managers than they had been before the introduction of JARs. In addition, there is now significantly more frequent discussions about work between supervisors and their immediate staff. Again, JARs have probably had an effect. They should have acted as a spur to supervisors to take a greater interest in, and to find out more

Figure 1. Comparison of perceived with actual overall performance markings



about, the work, just in case problem areas were communicated by subordinates directly to their managers. Furthermore, many problems not dealt with by the supervisor in normal work contact would be dealt with in the JARs, fed back to him, and would constitute the basis of greater communication. Unresolved problems could well have inhibited discussions in the past.

More accurate self-assessment

The majority of officers in the two samples had had at least two JARs and some as many as four. What, then, are the benefits to be derived from each successive JAR? One important gain is that the appraisee seems to get a much better idea of where he stands. This was investigated in PSA by comparing how people thought (on the basis of the interview discussion) their performance was rated with how it was actually rated on the staff report form. Whereas 20 per cent of those who had not yet received a JAR were unable to form any impression of their assessment, the equivalent figure drops to 9 per cent for those who had received one JAR, to 6 per cent for two JARs and down to only 4 per cent of those who had received three. Furthermore, the degree of discrepancy between perceived and actual ratings of overall performance measured by the difference in the number of points on the two assessments, and the extent to which this discrepancy is reduced by JAR experience (the number of JARs received) is clearly shown by *Figure 1*. Those who have not been given a JAR are considerably less well informed than those who have, while the more JARs the individual has experienced, the more accurate his overall assessment of his performance is likely to be.

Job satisfaction, work performance and overall attitudes

Does each additional round of JARs become any less effective and are there any other notable changes over time? These questions were of particular interest in HMSO because the scheme has now been operating there for some time, and the fact that the majority of respondents had had at least three JARs afforded a good opportunity to investigate these issues in the study. Changes in the effectiveness of JARs, in terms of increased job satisfaction and reported improvements in work performance, were measured by comparing the effects of the last JAR and the last-but-one JAR for each individual. The sample was then split up into three groups, according to the number of JARs received, and the data on effectiveness compared. No statistically significant differences were found between the groups, suggesting that, for example, the fourth JAR is no more or less effective in bringing about improved satisfaction or performance than the first or second. Similarly, overall attitudes to JARs were the same, regardless of the number so far received. Therefore, contrary to some people's preconceptions, these results from a large and experienced sample suggest that JARs do not become less effective or less popular over time.

Appraisees in HMSO were invited to comment on any changes they

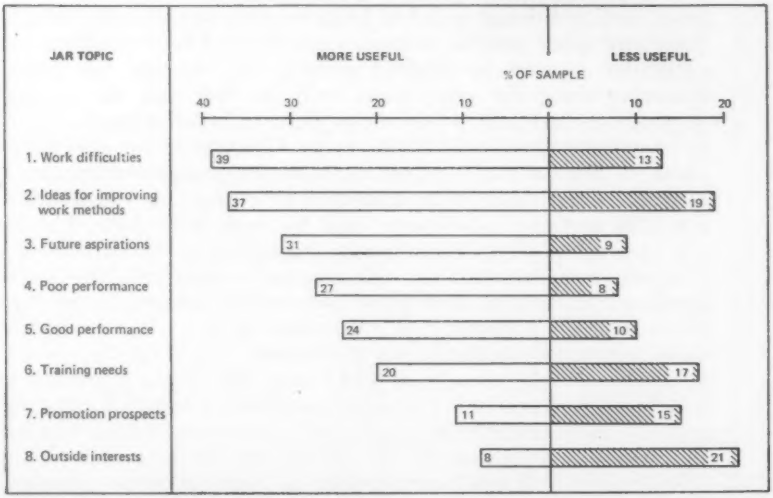
had noticed between their first and second JARs, and second and subsequent ones. Nearly all relevant comments, which were very few in number, were concerned with the formality of the interview and the time taken. JARs tended to become much less formal after the first one. Interviewees became less inhibited while interviewers became more proficient. Here are three typical comments from officers who noticed an improvement:

> The first JAR was conducted by the book and was very formal. Others tended to be more informal and, therefore, less nerve-racking.
>
> At the second JAR I felt more at home and was able to discuss matters more freely.
>
> As JAR succeeds JAR, so mine have tended to become less earnest, more open-handed and less concerned with the interview structure. Interviewers have become more adept with practice and JARs have become more useful as a result.

Usefulness of topics discussed

Do the various topics usually discussed in the JAR become generally more or less useful with each additional JAR or is there no change? This question was put to appraisers in HMSO and their replies are presented in *Figure 2*. The topics are ranked according to the number who think its usefulness increases. Between one-half and two-thirds of the sample considered that the usefulness of discussion on all topics except the first two did not change with successive JARs. The percentage for those who said there was 'no change' in usefulness have been omitted. More than one-quarter of these appraisers felt that discussion of each of the first four topics—Work Difficulties, Ideas for Improving

Figure 2. Changes in the usefulness of various topics of discussion in successive JARs - views of Appraisers in HMSO



Work Methods, Future Aspirations and Poor Performance—became more useful over time, and for each topic except 'Ideas for Improving Work Methods', more than three times as many thought discussions became 'more useful' than 'less useful'. Discussion of Good Performance was more likely to become more rather than less useful, although about two-thirds did not perceive any change. With Training Needs, the proportions were about the same. Only with discussion of the last two items, with Promotion and with Outside Interests, did more appraisers feel that it became less rather than more useful over time, though once again a majority felt there was no change.

Discussion

The overall picture obtained from these two studies of how the JAR scheme is progressing after several years is an encouraging one. Both those receiving and those giving the interviews usually perceive a wide range of benefits coming out of them for the individual and for the department. This is not to say that every interview is productive or well handled. However, if attention is paid to the factors identified in this article as being of particular significance in holding effective JARs, then the chances of success are good. It is particularly reassuring to find that JARs do not suffer any decline in effectiveness over a period of years and that in some respects they actually improve, perhaps reflecting the increase in familiarity with the procedure and in the skill with which it is handled.

The results of the HMSO and PSA evaluations must not be generalized too far, and it should be kept in mind that these two departments introduced their JAR schemes with great thoroughness and excellent training within the context of general staff management and with the full support of their departmental Staff Sides. Departments where the senior management is less involved in the scheme, where inadequate attention is paid to following-up action recommendations arising out of the JAR, or where the training given to appraisers is less impressive in quality or quantity can expect to derive much less benefit from the interviews done. And even with the best-run schemes, problems can occur which, if they go undetected, may detract from the overall effectiveness of the system and possibly undermine it. The individual circumstances of each department dictate that the JAR scheme be operated in a flexible manner and, as the various evaluation studies carried out have shown, the strengths and weaknesses of the JARs in one department are not always found to be the same in another. There is a need for departments to do their own periodic monitoring to check that the interviews are going well and that action is being taken when recommended. With departments having put in such good work to get the JAR scheme off the ground in the first place, it is all the more important to ensure that this initial investment keeps paying dividends.

Editor's note. A list of relevant reports is at page 179.

Programme Evaluation Review Technique

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During the last few years many techniques which were claimed to help management perform its tasks more efficiently have appeared, glowed quite brightly and apparently successfully for a while and then seem to have faded out again. I believe that one of the reasons for this has been overselling; too much has been made of the wonderful properties of the technique but too little has been said of the attendant disadvantages. Consequently certain measures have been adopted in the expectation of benefits, but have fallen into disuse when the implementation difficulties increased suddenly and the advantages to be gained seemed a long way off.

One technique that has survived all the vicissitudes, however, is network analysis, and in this article I want to skip lightly over the great advantages, which are comparatively well known, and concentrate more on the perhaps not so obvious difficulties that can be encountered. There are over 100 acronyms for the variants of project network analysis (PNA) as it is correctly termed. One of the originals was PERT (Programme Evaluation and Review Technique) which originated with the US Department of Defence and has since crossed the Atlantic and is in common use throughout the Ministry of Defence (MOD). It is also the name adopted by International Computers Limited (ICL) for the application package developed to handle network analysis and this sometimes leads to confusion. Henceforth I will adopt PNA for the technique which is generally handled by manual means, and PERT for that requiring computer application. My remarks on PERT will refer exclusively to ICL PERT which is in common use throughout MOD and is available on both the 1900 series and the 2903. A new version, details of which have not yet been published, will be available later for 2900 machines.

Before considering PNA perhaps it is as well to consider earlier methods of planning and controlling projects which are still in great demand. Bar charts of one form or another formed the basis of most schemes and their great advantage is that they are simple to under-

stand and interpret. Their disadvantage is that they do not show sequential relationships or interdependence of tasks and therefore cannot forecast the consequences of change. When things begin to change, and a certain law pre-ordains that they will, it is extremely difficult to assess the effects using a bar chart. One result of this is a tendency to build in an element of fat to allow for the unforeseen that, if taken to excess, can render the chart useless as a control mechanism because the schedule is so slack. On the other hand, if one is prepared to use resources uneconomically to ensure that changes to the schedule never occur, e.g. by excessive overtime, etc, then the bar chart can be used to manage the project. Generally, however, the bar chart soon becomes out of date and unable to predict the completion date—it often falls into disuse as a consequence. One great advantage of PNA is that it shows relationships and interdependencies and so can overcome this inherent disadvantage of bar charts. At the same time PERT is able to portray both the network and the results of its analysis in bar chart form and so retain the format that many of us have become familiar with and are able to handle with facility.

Another disadvantage of the conventional bar chart is its inability to pinpoint the really important parts of a job—those whose delay will vitally affect the completion date of the overall job. Similarly bar charts cannot warn when an apparently insignificant portion of a job has been delayed for so long that its completion is now vital to the whole project. This disadvantage is completely overcome by PNA which shows the critical path of activities (jargon for parts of the overall task) that immediately affect the overall completion date and also gives the amount of surplus time (called float in the jargon) on an activity which when used up by delay or extension of planned duration will cause that activity to become critical (jargon for directly affect the overall completion date).

PNA has the ability to portray relationships between activities and so more accurately model the true situation. This in turn identifies the critical activities and so allows management to concentrate its attention on those facets that are most important whilst bringing into prominence any activities that have changed priority for some reason or another. It is possible to operate a priority scheme for individual tasks in the overall job quite quickly and easily by considering the float of the activity—the smaller the float the higher the priority. The ability to model brings in another advantage of PNA—the assessment of the consequences of change. We are constantly seeking better ways of carrying out tasks and looking for the best sequence in which to perform them. PNA can answer the question, 'What happens if we do it this way?' New procedures can be simulated without putting them into practice with sometimes disastrous results should they prove wrong. Using PNA to simulate management can give an informed judgement on possible courses of action instead of relying on instinct or something similar.

Another advantage of PNA is its ability to schedule (jargon for give dates for) activities more accurately and so forecast the dates by which equipment will be required—and the consequences if it is not on time. In the engineering field, for example, it is common practice to ask for most items of equipment to be available at the start of the overall job. This leads to a surge of work for the stores organization which, however, does its best to deliver on time. As the equipment will not be used immediately it causes storage and deterioration problems—often it has been lost or is not fit for use when finally required. Other parts are not asked for until actually needed and are immediately urgent. Those people in such a situation do not need me to describe the overall effect. PNA cannot completely solve this problem because the unexpected will always be with us; but it can indicate when the known requirements will actually be needed and so spread the supply load as well as giving management more confidence in the dates quoted.

PNA, especially when the dynamic up-dating capabilities of a computer program such as PERT are applied to it, enables management to have a much more effective control over operations. As already noted, it specifies the relative importance of activities and so allows management to concentrate on the small number, perhaps 10 per cent, that really matter. Thus management is better able to apply its energies in the right direction. At the same time regular up-dating (up-dates are usually carried out at intervals of about 5 per cent of the overall time) ensures that the less important activities are not ignored to the point where they become a problem. A network also proves to be an extremely efficient means of communication. With a little practice it is relatively easy to see what is involved in somebody else's task and co-operation generally improves.

The co-ordination of various trades or capabilities is generally a great problem when managing a project and PNA can assist in this area. The schedules derived from time analysis (i.e. the analysis of the network with respect to time only) quite clearly show the resource requirements if the ideal, i.e. minimum overall completion time, is to be attained. They can demonstrate that it is necessary for a particular resource (which can be human, mechanical or something such as space) to be available for a specific task at a specific time in order to reach the ideal. Usually, however, this ideal can only be reached by the unlimited use of resources, such as weekend working or obtaining equipment that stands idle for much of its time, and this is clearly uneconomic. PNA gives management the means of making a reasoned judgement on the commitment, but we are now in an area where the use of a computer is well-nigh essential if the project is at all complex or of an appreciable size. PERT is able to analyse resource requirements and to show resource aggregation, which is the disposition of resources required to meet the ideal of the earliest possible completion date. This aggregation is extremely likely to be uneconomic and therefore impracticable, but it does show the maximum and minimum require-

ments for all resources and so enables management to deduce a level that is economically acceptable. This level can then be fed into the computer and PERT will develop a further network which retains the logic (jargon for relationships) of the original version but now takes into account resource limitations, e.g. only 10 fitters are available for this project at any one time, there is only sufficient space for one man to be employed in this area at any one time and so on. This is known as resource allocation and as activities have been moved to a time period when the required resources are available it usually results in the completion date of the project slipping from that given by time analysis because of the practical constraints of resource limitation. PERT can perform many variations on this general theme that are far too detailed to go into here. Suffice it to say that PERT is able to show when resources are required and, under control, smooth out the load on resources so that co-ordination of the different trades, etc, and also their productivity is improved. Management has the ability to trade-off resources against completion date and judge the effect before the work actually commences.

ICL PERT is a complex program suite that is said to have taken 150 man-years of effort to produce and has more capabilities than most similar programs. It is capable, for instance, of completing the resource allocation just described but still limiting the overall time by using threshold resources such as overtime; it is able to handle repetitive phases of a project where it is possible to start one activity before another has finished in apparent defiance of logic, e.g. the first batch of a large number of parts can be assembled before the final batch is made; it can convert from numbers of weeks into actual dates taking into account closed periods; it can provide cost information of specific jobs or whole sections of a project; it can provide milestone information only (rather than all the detail) for more senior management; it can split a large job, e.g. the refit of a ship, into sub-projects which can be dealt with separately or it can combine several projects into one, e.g. a number of aircraft being serviced at one unit can be handled as separate projects within the resource limitations of the entire unit; it can show the results in an almost infinite variety of ways to the requirements of the user. This last capability can become a mixed blessing if too great a variety of output is employed—apart from the time and cost of printing, users can get bewildered by the amount of paper flowing.

This is just a selection of PERT capabilities that are too numerous to detail here, but many of them are being put to good use within MOD. For example, the overall time of some tasks has been reduced by up to 45 per cent, in other cases the work content has increased by over 35 per cent, whilst the overall time has decreased 30 per cent. In fields other than MOD, PNA has been much used in construction (missiles, aircraft, ships, bridges, motorways, etc), maintenance, production of software, surgery, preparing tenders, use of broadcast studios and a host of other tasks. Its versatility is demonstrated by the differing

uses which are continually being found for the technique, but it is not a magic cure-all and it does have a number of drawbacks, largely in implementation. It is a very powerful management tool, but it does demand something in return, partly because of PNA itself and partly because we are using a computer in the process.

Manual systems of planning and control can often be circumvented and frequently are ignored until some specific event occurs, such as an enquiry from higher management or a progress meeting where a particular item is on the agenda. In many instances manual systems take the form of catching up with the latest information on progress—a 'latest state of the parties' report—rather than an indication of whether we are still on target. Indeed all too often there is no positive control whatsoever—merely a negative sort of reaction to reported crises and external enquiries. The introduction of PERT is likely to be traumatic in such circumstances. Requests for information on the progress of all tasks that are in hand at that time, especially with the deadline of a computer run to meet, are likely to cause great consternation in an organization used to answering questions on just those tasks that are prominent for some reason or another. This particular problem is rarely as great in practice as it appears on first sight because the information required is minimal, but nevertheless it does pose a mainly psychological question. One way of easing the advent of PERT is to tighten up the existing manual system of reporting and to make it work in the manner it was intended some years previously. In the longer term the problem generally disappears completely once the necessary mental adjustments have been made and reports are made quite naturally as a job is started or finished. The reporting load also lessens because immediate answers to outside enquiries are now available from PERT and there is no need for special requests for information from staff.

Perhaps the greatest difficulty in implementing PERT is that it often requires a change of attitude on the part of management. Previously management, not knowing which parts of a job were really important and which parts could safely be left for a while, tended to push for the early completion of all the component work. As a consequence higher management becomes too involved in detail, lower management gets sidestepped and becomes disgruntled and management as a whole becomes immersed in solving problems that may well have no good effect on the overall completion whatsoever, and the usual solution is more overtime. Generally in these circumstances the completion date of the whole job is not known until a short time before it actually occurs —nobody is able to say with any degree of confidence what effect a particular course of action will have on the end date. A management used to this environment will find it difficult to adjust to a system such as PERT which is able to predict, say, six months before the final completion date that unless a particular activity is finished within three days, for example, the end date of the project will be adversely affected.

The co-ordination aspect of PERT also requires a change of attitude in some cases. There have been occasions when somebody who has to complete his task before others can start has kept quiet about difficulties or delays and consequently the person at the end of the chain of activities has been faced with an impossible task, not of his making, in trying to meet the deadline. These circumstances have arisen not through deliberate machinations but in a genuine belief that all would come right in the end and a lack of awareness of what others had to do. PERT, properly applied, will prevent this situation arising, but will require all involved to be open about their achievement or lack of it —the results of an early backslider will be evident and the work to be done later by others will be clearly shown, it will be much more difficult to pass the buck.

Sometimes the introduction of PERT to an organization is the first contact with a computer and also with PNA techniques. The effects of the introduction of a computer are too well known to be repeated here, but they can be compounded by the simultaneous introduction of PNA and so deserve careful attention. Both computers and PNA force differing disciplines on their users—the computer with its deadlines and PNA with its questions—and great difficulties are likely to arise unless this is recognized in advance. In common with most systems, the biggest problem is acceptance by the final users who can wreck any system by non-co-operation. These users will probably be firmly wedded to their existing methods and unable to see any necessity for the new scheme of things. It is essential that they know and understand what is happening and how the new methods can improve the capabilities of the organization. It is above all necessary for them to be involved in drawing up the network (which is in any event likely to be inaccurate otherwise) and it is highly desirable that they are helped personally by PERT. For example, many keep notebooks listing the work to be done, and these can be replaced by PERT documents which can be used both for reference and reporting. Experience shows that provided this kind of approach is adopted there is a firm and ready acceptance of PERT by the end users.

On reflection the difficulties of PERT have turned out to be difficulties of implementation—largely the problems of management in adjusting to the new information that is available from the advantages of PERT. The major point is that although the system is used to plan and control work—and does this most successfully—it also forces disciplines on to management in ways and areas previously unknown. This can prove quite a shock, but if recognized and allowed for then the investment in PERT will be amply repaid.

The Response to the Fulton Report

A Sub-Committee of the House of Commons Expenditure Committee, under the chairmanship of Mr. Michael English, MP, is currently conducting an investigation into the efficiency and effectiveness of the Civil Service. As part of its evidence to the Sub-Committee, CSD submitted a memorandum, *The Response to the Fulton Report*. The following is an abridged version of the first part of that memorandum; the second part, covering personnel management and career planning, structure, accountable and efficient management, planning in departments, pensions and retirement, the Civil Service and the community, and accountants, lawyers and research officers, will be published in the November edition of *MSIG*. —*Editor*.

Civil Service Department: its role and responsibilities

On the day of publication of the Fulton Report (Cmnd. 3638) the Prime Minister announced (Official Report, Volume 767, Column 455) that the Government accepted the proposal to establish a new CSD. It came into existence on 1st November 1968, encompassing the Civil Service Commission and the functions exercised by the Pay and Management Group of the Treasury. Formal arrangements were made to ensure the continued independence of the Commission in the selection of individuals for appointment to the Civil Service. The Prime Minister, as Minister for the Civil Service, is responsible for the work of CSD, retaining direct responsibility for machinery of government, appointments and security, and otherwise delegating day-to-day responsibility to a Cabinet Minister. The official head is designated the Head of the Home Civil Service, but shares his lead in pay with three other official heads of departments (rather than having the unique lead proposed by Fulton).

The functions of CSD may be broadly classified under two headings:

(*a*) Personnel management: responsibility for policy and central arrangements for recruitment, selection, training, promotion, postings and general career management; terms of service, including control of rates of pay and allowances; the structure of the Civil Service in terms of grades and occupational groupings; the development and execution of policy on Civil Service superannuation; co-ordination of pension arrangements throughout the public sector; catering, welfare and security.

(*b*) Administrative and managerial efficiency: responsibility for the development and dissemination of administrative and managerial techniques; for the general oversight of the organization of departments and for continuing study of the machinery of government; providing central management services, e.g. organization and

methods, computers and operational research; exercising central authority in respect of departmental administrative expenditure generally, and departmental manpower requirements in terms of both numbers and gradings.

CSD also provides certain common services for a number of departments, for example, catering services and a computerized payroll service.

CSD is staffed by a mixture of long-term and short-term appointments, including specialists, e.g. scientists, engineers, psychologists and other professionals. The staffing policy recognizes the desirability of securing a high degree of interchange of personnel between CSD and the Civil Service generally. The present move is towards a cadre (including short-term appointments) of some 100 per cent of complement (excluding most posts in the College and some other highly specialized posts which are open to all in the Service), with up to 25 per cent of CSD's posts at any one time, particularly at more senior levels, being filled by interchange from the Service generally.

In July 1968, with the Prime Minister's approval, a committee consisting of a number of senior officials, including senior professional civil servants, was set up to assist the official Head of the Home Civil Service in making his recommendations to the Prime Minister for the filling of Home Civil Service vacancies at Deputy Secretary level and above. The committee has met monthly since then.

The planning of CSD's work is supervised and directed by the Permanent Secretary's Management Group, comprising the Department's Permanent and Deputy Secretaries and Principal Establishment/Finance Officer. It is served in this function by the Central Division.

By separating the management of the Civil Service from the Treasury and bringing it directly under the Prime Minister, the Government established it as a central function in its own right. In turn, this has helped CSD to develop as a central department in its own right, with its own outlook and professional skills.

CSD's relations with other departments and staff associations

Other departments

Fulton recommended that there should be delegated to individual departments the maximum authority in staff and organization matters compatible with the requirements of the Service as a whole. These recommendations have been accepted, the role of CSD being one of partnership with the other departments in running the Civil Service and in planning and implementing the developments that are needed in it. In management services there has been a move towards greater self-reliance within departments on their own management services and computer resources, while CSD builds up its competence in specialist techniques and deals with interdepartmental problems after necessary consultation. In personnel management, while CSD plays a larger

part, each department continues to have the main responsibility for its own staff, and progress is being achieved mainly by extending and improving personnel management work within departments; with CSD co-ordinating departmental thinking and offering advice and guidance where possible.

CSD is consulted about all appointments at Under-Secretary level, and forthcoming vacancies at Under-Secretary level throughout the Service are monitored by CSD to ensure that the most suitable candidates are considered for promotion. A representative from CSD is frequently invited by departments to sit on departmental promotion boards when candidates for promotion to Under-Secretary are being considered. To enable CSD to make an effective contribution in ensuring consistency of practice throughout the Service, and to exercise a central role in managing the career development of staff with high potential, a comprehensive register of all staff at and above Under-Secretary, and staff below this level who have the potential to be considered for appointments at and above Under-Secretary level, is maintained in CSD. Departments are asked annually to review their lists of promotable staff and to send up-to-date assessments to CSD. Particular attention is paid to staff considered to have the potential to rise to Deputy Secretary and Permanent Secretary level and CSD seeks to ensure that such staff have as wide an experience outside their own departments as possible at an early stage in their careers. In addition, departments are asked to train as many as possible of their high quality staff in the specialist areas of personnel and finance work with a view to building up a nucleus of staff for eventual succession to the key posts of Principal Establishment Officer and Principal Finance Officer.

Departments have been asked to frame schemes for career development of their staff, and CSD has co-ordinated these studies. As a result, a more systematic approach to career development is being introduced throughout the Civil Service.

H.M. Treasury

Responsibilities between CSD and the Treasury are divided as recommended by Fulton, with the transfer of the functions of the old Treasury Pay and Management Groups. CSD exercises these functions in such a way as to foster increased efficiency and economy in the Civil Service in the performance of its tasks while the Treasury continues to exercise its responsibilities in the economic and financial fields.

The working procedures established between the spending departments and the two central departments have proved themselves and are well understood. Departments' estimates are addressed to the Treasury, but CSD is responsible for any decision involving the scale of staffing. Hence, while the Treasury retains general responsibility for public expenditure management, CSD is specifically responsible for questions involving manpower. The Treasury's domestic Estimate and CSD's domestic Manpower Estimate are approved by the CSD Man-

power Group. Other domestic CSD expenditure is subject to Treasury approval in the normal way.

Staff associations

Joint consultation has been a vital component in the effective implementation of the changes stemming from Fulton. The existing Whitley system, with more than 50 years' experience, provided the necessary vehicle, but some specific developments were thought necessary to cater for Fulton.

On the official side the interdepartmental consultative machinery was headed by a steering committee under the chairmanship of the Official Head of the Home Civil Service, consisting of Permanent Secretaries and top professionals from several departments. Four subcommittees were also set up to deal with grading structure, recruitment, management and training, and the organization of work. Special arrangements were also made by the Staff Side of the National Whitley Council.

The Fulton Report recognized that the short-term implementation of the recommendations would raise different problems for the consultation machinery from those of the long term. In the short term, adaptable machinery would be needed, capable of speedy decisions. The then existing Whitley machinery was, therefore, adapted by establishing a special Joint Committee of the National Whitley Council as the main forum for both consultation and negotiation, without any limiting terms of reference. Its task was a general one: the reconstruction of the Civil Service, with the Fulton Report as the basic factor in that programme. The Committee prepared four annual reports, 1969–72, outlining the issues involved in implementing Fulton, explaining how they were being tackled and describing those on which action had been taken.*

The changes in Civil Service structure which resulted from those discussions inevitably affected the staff associations for the grades involved. The absorption of some departmental grades into the Administration Group has led their staff associations to merge with the Service-wide associations. For example, associations representing departmental grades in the Department of Employment and the Court Service have merged with the Civil and Public Services Association or with the Society of Civil and Public Servants. Another type of merger has been that of a number of associations representing staff in Customs and Excise, who first formed a single Customs and Excise Group and then merged with the Society of Civil and Public Servants. Nevertheless, the merger of the main general service classes into the Administration Group and the aggregation to it of other departmental classes has created some problems over the demarcation of representation between associations.

**Developments on Fulton* (1969); *Fulton: A Framework for the Future* (1970); *Fulton—The Reshaping of the Civil Service: Developments during 1970* (1971); *The Shape of the Post-Fulton Civil Service* (1972).

We understand that the National Staff Side has been reviewing the longer-term internal organization of the Civil Service trade union movement. Meanwhile, substantial improvements have been made in the ability of staff representatives to perform their tasks through the conclusion of a comprehensive, liberal and up-to-date agreement on the facilities available to them.

Recruitment

Integration of recruitment, training and career management

The setting up of CSD in November 1968, and the integration into it of the Civil Service Commission, gave practical effect to the recommendation that there should be a closer and more coherent relationship between recruitment, training and all other aspects of Civil Service management. Formal arrangements were made to ensure the continued independence and political impartiality of the Civil Service Commissioners in the selection of individuals for appointment to the Civil Service. In practice, these arrangements have worked well.

Arrangements for the division of recruitment between departments and the Civil Service Commission have been reviewed not only in the light of Fulton's recommendations for greater departmental influence on recruitment, but also in the context of the changes in recruitment and establishment arrangements resulting from the introduction of the new Civil Service Pension Scheme in June 1972, including the abolition of non-pensionable temporary appointments of indefinite duration.

Greater flexibility has been introduced into the recruitment arrangements to ensure that departments get the staff they need as quickly as possible. For scientists and for some other grades, new 'decentralized' arrangements have been introduced which make departments responsible for the administrative handling of the recruitment process. The Commission participates in short-listing and in the selection board, for which the Commission normally provides the chairman. A substantial measure of recruitment was already delegated to departments; this has been extended to permit the delegation of recruitment of Assistant Scientific Officers and of Professional and Technology Officer, Grades III and IV.

Fulton proposed that departments should be better represented on central selection boards, and that these boards should be primarily composed of younger people. Both proposals reflected existing practice, for example, in the recruitment of scientists and H.M. Inspectors of Taxes. It is difficult to free serving civil servants from their day-to-day work in sufficient numbers to cope with recruitment needs. But departmental representation has been increased as recommended; for example, in the extended interview system of selection for graduate administrators, most interview teams now include a youngish Principal serving in a line-management job, while about a third of the intakes are chaired by serving Under-Secretaries despite the difficulty of

securing such people. A high proportion of young psychologists is also employed. In the recruitment of Executive Officers (EOs) the composition of boards has been altered so that there are now two departmental members rather than one, and two members drawn from the Commission's panel of interviewers.

Relevance of previous academic study

The Prime Minister announced in the House of Commons on 21st November 1968 that the Government had rejected the majority Fulton recommendation that in selecting graduates for administrative posts, preference should be given to those whose university studies had been in subjects considered closely relevant to Civil Service work (Official Report, Volume 773, Columns 1553 and 1554). This decision did not, however, imply dissent from the more general recommendation that candidates should be selected with a potential for developing the kinds of quality and expertise which are relevant to Civil Service work—including the ability to use quantitative methods and to understand numerical techniques. Some of the tests taken before and during the extended interview system of selection are designed to explore those characteristics, and successful candidates are given relevant training after entry.

In the case of specialist posts, entrants with such qualifications as the HNC, or with 'A' levels in scientific and technical subjects, are already assigned to posts where their qualifications are relevant. Non-specialist qualifications may be regarded as tentative pointers to the work to which school-leavers are assigned, but, if they are to specialize, performance during the early years of service seems to provide a more useful guide than their qualifications before entry.

The majority of school-leavers come into the Administration Group in the clerical and executive grades. Assignment to departments depends largely on their preferences for location and department and the existence of vacancies. For school-leaver and graduate entrants to the EO grade, the Commission provides departments with information about special aptitudes or suitability for a particular type of work when this can be established at the selection stage. Departments are also provided with candidates' application forms and other recruitment papers, so that they now have much more detail about the candidates assigned to them than hitherto.

Methods of selection and problems of delay

As a direct result of Fulton, two investigations were completed in 1969 into methods of selection and problems of delay in recruitment procedures.

The Civil Service Commission was restructured on a line-management basis following a report by management consultants into the working of the Commission. This change resulted in a substantial speeding-up of the competition procedures (up to 30 per cent improvement in many

cases with a 15 per cent reduction in staff), helped by computerizing some of the major schemes involving written examinations.

The report of the Davies Committee (Cmnd. 4156) into the extended interview (Method II) system of selection of graduate administrators found no fundamental weaknesses, but suggested a number of (mainly procedural) changes, covering such questions as the selection and training of assessors, follow-up and research. These have been adopted. They dismissed the idea that there was social bias either in the procedures or on the part of assessors, and concluded: '. . . the make up of the entry . . . reflects the character of the candidates who chose to compete rather than the choice made by the selectors from within that field'. Overall the Committee concluded that the Method II selection system was one which the public service could point to with pride and added: 'no other post-war development in the field of personnel selection in this country has had so strong and so pervasive an influence . . .'.

In 1973, CSD's Behavioural Sciences Research Division was asked to undertake an evaluation of procedures used in the selection of specialists, with particular reference to the part played by the board interview. BSRD conducted a pilot study on recruitment of H.M. Inspectors of Factories, and a number of improvements have been made to the selection methods used in that recruitment. Following publication of the BSRD report, a Commission working party was set up in August 1975 to consider ways of improving selection methods for a wide spectrum of specialist posts. In the meantime, experiments are being tried in the selection of Actuarial Officers and Legal Assistants.

The Method I system of selection of graduate administrators has been abolished, but separate entry competitions for grades such as Inspectors of Taxes and Department of Employment Cadets were shown to be necessary and have continued, with departments playing an increased part in the selection processes.

Introduction of a training grade for the graduate entry

A survey of departments' manpower requirements pointed to a clear need for some strengthening of the Service's middle management in order to cope with the greater complexity of government administration and the increasingly sophisticated techniques required to tackle it. The survey showed that graduate recruitment needed to be expanded, and that the extra graduates would be required for a wide range of administrative work and would need to possess much the same blend of personal and intellectual qualities as had been sought in Assistant Principals (APs), though to a rather less marked degree.

Arrangements for managing an expanded graduate entry were introduced with the merger of the Administrative, Executive and Clerical Classes into the Administration Group on 1st January 1971. The merger was accompanied by a major change in the recruitment of graduates for administrative work. The object of this change was to provide the necessary strengthening of the Civil Service's middle management

without diminishing the attraction of the Service for the most able graduates who had previously entered the Administrative Class as APs and who would continue to be a vital source of supply for many of the top posts in the Service. It was decided to recruit to the graduate entry of the Administration Group about twice as many graduates as had been recruited as APs and from a rather wider range of abilities; and at the same time to provide better opportunities for earlier rapid advancement, on equal terms with the graduate entrants, for the most talented young men and women already in the Service. Under these arrangements graduate and in-service candidates are selected under the same procedure for appointment as Administration Trainees (ATs). With a few modifications the procedure is the former Method II system of selection for APs. With the introduction of the new AT grade the grade of AP was abolished. The best ATs are selected for promotion to HEO(A) ('fast-streamed') between two and four years after becoming ATs. Departments' recommendations for promotion to HEO(A) are subject to review by the Central Probation Board whose functions have been extended for the purpose. HEO(A)s are considered for direct promotion to Principal after two to three years in the grade.

In addition to graduates recruited under the AT scheme, the number of graduates who enter the Administration Group as EOs has been rising steadily over the past few years: there were about 1,300 in 1973, about 1,800 in 1974, and 1,800 again in 1975, compared with about 300 in 1968.

New terms of employment

Fulton's recommendations relating to new terms of employment are dealt with later. The following paragraphs are concerned with their implications for recruitment and probation, which must also be viewed against the decision, recommended by Fulton, to extend the pension scheme to cover temporary staff.

Important changes have been made in recruiting arrangements following the introduction in June 1972 of the new Civil Service Pension Scheme. All civil servants, apart from certain special cases, are now covered by this scheme. This has meant the disappearance of the non-pensionable unestablished or 'temporary' civil servant. The Civil Service Commission has always been the guardian of standards in permanent appointments to the Civil Service, and has a particular responsibility to ensure that staff are selected on the basis of fair and open competition. New recruiting arrangements have been introduced which ensure that the Commission fulfils this traditional function and at the same time enable departments to play their part in selecting staff. All applicants for Civil Service posts are now tested against the appropriate standard, and if successful are given established appointments at the outset, subject to confirmation on satisfactory completion of probation. The Commission's Certificate of Qualification remains the hallmark of permanent appointment. Unestablished appointments are

made only where there is a shortage of applicants fully up to the appropriate entry standard; where there is a doubt about the applicant's health; or where for certain grades it is impracticable to test against standard on initial recruitment and all recruits have to be tried out in the job. Unestablished appointees are established after a satisfactory period of trial service, or their appointments are terminated if their service is unsatisfactory. Established and unestablished appointments are made from the same recruitment scheme, which is run by the Commission where recruitment is centralized and by departments where it has been delegated. Departments are free to recruit staff for limited period appointments of up to five years, and for casual or seasonal employment.

A standard period of probation would run counter to the concept that, as a matter of good management practice, probation periods should be kept as short as possible, provided that they fulfil their function, so that recruits may know where they stand as quickly as possible. Accordingly the existing probation periods, which are one or two years according to the level and nature of the post, have been retained, rather than making all probation last two years.

The corollaries of offering an established appointment at the initial recruitment stage are first that selection must be as reliable as possible and, second, that probation should be an effective supplement to selection and a real beginning to career management. The new pattern of recruitment leaves unchanged the character of probation; it provides a testing time during which a recruit shows by his performance his fitness for confirmation in an established appointment.

Fulton also recommended that probation should be made more effective. Meaningful probation has an important part to play in the management of new recruits, and it has been stressed to departments that termination of appointment, or where appropriate regrading, must be used without hesitation where it is clear that the individual is not up to the required standard. The central probation arrangements have been maintained for ATs, direct-entry Principals and grades in the Science Group above Scientific Officer.

It was also necessary to consider the position of existing unestablished staff, and any others appointed during the latter half of 1972 pending the introduction of the new recruitment arrangements. It was decided that all unestablished staff in post before the introduction of the new pattern of recruitment, apart from certain special cases, should be nominated by their department for establishment as soon as their performance on the job was considered to be satisfactory, provided they had served for not less than the probation period appropriate to their grade; and that they should in any event be nominated on completion of five years' service.

Value of outside experience

The value to the Civil Service of contact with the outside world has

been acknowledged, and Fulton's recommendations have been accepted in principle.

Late entry currently takes place at Principal level in the Administration Group, and is very common in all specialist fields. In addition, some direct recruitment of older EOs (i.e. beyond the normal direct recruitment upper age limit of 28) has taken place in recent years in order to meet specific needs.

Period appointments are quite common in the specialist fields and can occur at high levels. The number of such appointments is believed to have increased, but there is no central information on them.

It has been the practice over several Administrations for special advisers to be appointed by Ministers. Since the present Government returned to office in February 1974, this has happened on a larger scale than hitherto, with the number of special advisers totalling at one time some 40. Most of these, whether full-time or part-time, have been paid from public funds and treated as civil servants on period appointments. Guidance on the appointment and conditions of service of special advisers is a matter for the Prime Minister of the day; special advisers are normally subject to Civil Service rules of conduct.

Terms and conditions of employment

Terms of employment

Most of the distinctions between 'established' and 'unestablished' status have been removed. Following the introduction of the new superannuation scheme for the Civil Service in June 1972, all appointments qualify for pension purposes, and all candidates who achieve the appropriate standard on initial recruitment and are successful are given established posts from the outset, subject to confirmation of their appointment on the satisfactory completion of a probationary period.

The grounds for prematurely ending a civil servant's employment have been clearly laid down, as Fulton recommended. In all cases, as much informal notice as possible is given, and when retirement is in the public interest, established staff are guaranteed at least six months' formal notice.

With the introduction of the new pension scheme, 'temporary' status was abolished, so that a further recommendation of the Fulton Committee—that temporary staff should be offered short-term appointments for a specified period of years—was covered indirectly.

Working environment

Action on the working environment of civil servants has been jointly co-ordinated by CSD and the Property Services Agency (PSA), and since 1973 by the Working Environment Joint Unit (WEJU) which is staffed by, and reports to, both. The Joint Committee on Accommodation of the National Whitley Council has replaced the occasional Official Side/Staff Side meetings which formerly dealt with accommodation matters.

While many civil servants already enjoy reasonable working con-

ditions, there has been wide agreement for some years that for many others improvements were needed in the interests of efficiency and good staff morale.

The quality of accommodation is governed in the long term by a set of office accommodation standards which are being systematically reviewed in consultation with professional experts, departments, the Staff Side and the Treasury. Meanwhile, the many existing offices which are below the present standards are being improved in annual instalments, as resources permit, according to priorities decided in consultation with the occupying departments and the Staff Side. Progress has to take account of the need for strict economy in public expenditure.

Following the report of an interdepartmental working party on office cleaning, and discussions with representatives of employers and employees in the contract cleaning trade, revised arrangements are being introduced which should result in significant improvements in the standard of cleaning in government offices.

Pay

Civil Service pay has continued to be determined by the principle of fair comparison subject to the requirements of national incomes policy. The Civil Service Arbitration Agreement continues to provide for reference to the Civil Service Arbitration Tribunal in cases where the Official and Staff Sides cannot reach an agreed settlement on pay or other specified matters. At the time of the Fulton Report the pay of the main grades was the subject of a pay research survey every three years; during 1970 it was agreed with the National Staff Side that the length of the cycle should be reduced to two years, and in 1974 a comprehensive new pay agreement was concluded which provided for annual pay reviews in accordance with the established principles of fair comparisons and for consolidation and improvement of the detailed procedures. Under the recent White Paper *The Attack on Inflation*, however, the process of comparison and the 1974 pay agreement are for the time being suspended.

The salaries of high-level public servants (including senior civil servants from the grade of Under-Secretary upwards) are determined separately. The Top Salaries Review Body (TSRB) was set up in November 1970 to make recommendations to the Prime Minister about such salaries, and the first interim review of Higher Civil Service pay by this body was operative from 1st January 1972. The TSRB's first substantive review was not completed, however, until the end of 1974. It was accepted in principle by the Government for Civil Service grades, and the recommended new rates were promulgated from 1st January 1975; but in view of the national economic situation, the increases for those earning over £13,000 were staged, the second part being payable from 1st January 1976. Under the terms of *The Attack on Inflation* the second stage will not now be paid from that date though the full promulgated amounts will continue to be reckonable for pension purposes.

Fulton's recommendation that there should be a range pay system based on performance for senior civil servants has not been accepted; a team of management consultants and civil servants, set up in 1969, advised that the existing system of fixed salaries at Under-Secretary level and above should continue. The former Standing Advisory Committee on the Pay of the Higher Civil Service, in their Ninth Report, agreed with the Fulton recommendation on range pay; and the TSRB discussed the point in paragraphs 42–44 of their Report No. 6. The TSRB noted the near-unanimity of evidence expressed to them against the introduction of range pay, but said that they hoped the issue will remain alive and be the subject of further discussion in due course. CSD, therefore, intends to give further consideration to the question of merit pay in this area at an appropriate time.

The proposal in the Fulton Report that pay at lower levels should be used more flexibly to recognize merit has not so far been implemented, but in the typing and machine-operating areas new salary structures have been introduced as a general measure which lay greater emphasis on proficiency and experience. Additionally, an exercise was carried out by the Pay Research Unit during 1975 to ascertain the practice in outside organizations on the relationship between proficiency or merit and long-service payments. The report on this has been received recently, but incomes policy constraints rule out the possibility of any early practical action. The rules for starting pay on appointment for ATs, Scientific Officers, Professional and Technical Officers and analogous grades, and members of the Typing and Secretarial grades, do provide, however, that relevant outside experience (which may include obtaining higher qualifications) is recognized by awarding increments above the minimum of the relevant entry scale. Up to six increments may be awarded to ATs. Scientific Officers and Professional and Technical Officers may be awarded increments up to the maximum of the scale. Typing and Secretarial grades may be awarded up to two increments for experience.

Training

Civil Service College

The Prime Minister announced on the day of publication (Official Report, Volume 767, Column 456) that the recommendation for a College had been accepted, and it was formally opened two years later. The development of the College is described in the four progress reports on Fulton issued by the Civil Service National Whitley Council during 1969–72 and the Civil Service College Annual Reports.

The following list of the groups of courses offered by the College for 1975–76 illustrates the way in which Fulton's recommendations have been met:

(*a*) Courses and seminars designed for civil servants at about SEO level and above:

(i) Senior seminars, intended primarily for civil servants at about Assistant Secretary level and for more senior people, which include a number for civil servants who have recently been promoted to Under-Secretary.

(ii) The Senior Course which is an introductory course designed for civil servants at about Assistant Secretary level who have had little or no formal training in management or administration.

(iii) The middle management courses designed for SEOs and staff at an equivalent work level.

(iv) Courses in specific subjects designed for civil servants in the range SEO to Assistant Secretary and for those at equivalent levels. These are divided under the broad headings of public administration, personnel management, social policy and administration, economics, and statistics and operational research.

(*b*) Courses designed to provide career-related training for staff at HEO level in all groups.

(*c*) Courses designed for specialists:

(i) The introductory course for graduate specialists, the aim of which is to help the specialist at an early stage in his or her career to gain a better understanding of the system of government in Britain and to improve his or her management capabilities.

(ii) The course for Assistant Statisticians and Economic Assistants for which Actuarial Officers may also be nominated.

(iii) The practical course for statisticians, which aims to introduce new entrants to the Statistician Group to the practical side of government statistical work.

(iv) The introductory course for lawyers, held for new entrants to the Legal Category, is aimed at increasing understanding of the structure and operation of the Legal Civil Service and its relationship to the Civil Service as a whole.

(v) The administration course for specialists, which forms part of the training for civil servants who have been accepted for the Senior Professional Administrative Training Scheme.

(vi) Refresher courses for economists, lawyers, statisticians and other specialists.

(*d*) Courses for ATs and for HEO(A)s which aim to introduce management techniques and the machinery and practice of government.

(*e*) Courses for departmental tutors and lecturers.

(*f*) A range of short job-related courses for staff at HEO level and below working in small departments that do not have their own training facilities.

(*g*) Management services and accountancy courses.

(*h*) ADP training for computer staff.

The following features of the College relate to Fulton recommendations about how it should operate:

(*a*) Courses and seminars are run at three centres, in London, Sunningdale and Edinburgh. The latter two have residential facilities.

(*b*) The College employs a small number of full-time staff engaged in research projects mainly arising out of the need for teaching material.

(*c*) Courses have not been confined to civil servants, but have included members from all fields of public service, from nationalized industries and private industry, the universities and overseas governments.

(*d*) About 40 per cent of the teaching is provided by College staff, with the remainder coming from departmental civil servants, universities and all sectors of industry and business.

(*e*) The College forms part of CSD, but has its own Advisory Council under the chairmanship of the Permanent Secretary, on which serve eminent members of the academic and business worlds and of local government, as well as senior civil servants from the Home Civil Service and the Foreign and Commonwealth Office. The National Staff Side is represented on the Council, and the views of the Staff Side are also taken into account through the Joint Committee on Training. As a development of the recommendations of the Heaton/Williams training review (see below) a liaison committee on which senior departmental civil servants and the Staff Side are represented has been set up to advise the College and to improve liaison with departments and the Staff Side. A Consultative Committee, on which a number of Principal Establishment Officers serve, has also been established as a forum for the interchange of information and views on College teaching and research between the College and its principal customers.

Graduate trainees

The training of graduates under the AT scheme follows very largely the recommendations in Fulton, allowing for the rejection by the Government of the majority recommendation 24 ('preference for relevance'). These graduates receive a short induction course soon after their arrival in their own departments. Thereafter the initial pattern was a three-month course at the College after about two years on the job, followed, for those 'fast-streamed', by a second course at the College of about the same length shortly before promotion to Principal. This pattern is now being changed to shift the balance of training more heavily towards the general body of ATs rather than the fast stream and also to shorten courses. The new pattern is a 10-week course at the College after about one year's service in the grade followed by a second 10-week course after about two years in the grade for all ATs. Those who are fast-streamed would return for a third 10-week course shortly before promotion to Principal. The first-stage courses were introduced in the summer of 1974 and the second-stage courses in the

autumn of 1975. The new third-stage course for fast-streamers has not yet been developed, but, as originally conceived, would be needed in the academic year 1977–78. This change in the pattern has not altered the fact that those who rise to Principal other than through the fast streams, i.e. by way of HEO and SEO, are, of course, eligible for the courses offered by the College for those grades.

There are also four-week introductory courses for graduate specialists designed for honours graduates and those with equivalent qualifications to help the specialist at an early stage in his career to gain a better understanding of the system of government in Britain and to improve his management capabilities. And there are four-week courses designed to give Assistant Statisticians and Economic Assistants, at about the end of their second year of service, a general understanding of the machinery of government; of the social and economic environment within which government is carried on; of the various constraints that bear on the decision-making process; and of the role of statisticians and economists in that process. (There are the courses referred to at (*c*)(i) and (ii) above, and their timing is now under review.)

Training outside the College

Most Civil Service training takes place within the employing department. In 1971–73 CSD and departments, in conjunction with the National Staff Side, conducted a detailed review of management training at EO, HEO and SEO levels, and the implementation of the resulting recommendations, although necessarily a long-term project, is progressing satisfactorily. There was also a similar review of supervisory and developmental training at the clerical level. The balance between central and departmental training was one of the principal questions to which Mr. Neville Heaton and Sir Leslie Williams were asked to direct their attention when they were appointed in 1973 to conduct a review of Civil Service training. The conclusion has been drawn from their report that the existing balance between the two is about right. Both the Civil Service College and departments continue to send people to courses at outside educational establishments (including the universities and business schools mentioned by the Fulton Committee). There has been an increase in the number of civil servants attending external courses since the Fulton Report, although use of the business schools decreased after the establishment of the Civil Service College. Training for school-leavers includes encouragement and opportunities to gain qualifications appropriate to their work through studies both inside and outside the Service.

The Linmap Computer Mapping System

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Introduction

Many of those who carry out planning work rely on tabulations and rarely use maps: for example, economists and statisticians. Whilst lists or tables can provide much useful information about an area, they lack one basic feature: they do not show the spatial distribution of the data. Maps, unlike tabulations, draw attention immediately to areas where problems are concentrated.

A thematic map enables highly condensed data to be presented clearly. For example, if elderly people were listed from the 1971 Population Census for each of the approximately 18,000 wards and parishes of Great Britain, it would occupy about 700 sheets of computer print-out. Even if the information were to be presented for each of the 1,765 local authorities (pre-1974), it would still occupy some 70 sheets of print-out. Linmap can produce a summary of this information as an illustration on a single sheet of paper. It is very necessary to summarize information in this way today, when administrators and policy-makers can be overwhelmed by the volume of data which may be presented to them.

Frequently maps summarizing large quantities of data are required quickly. The manual processing of statistics and preparation of conventional maps are so time consuming and costly that it is not feasible to produce a conventional thematic map. The Linmap system was specifically devised to automate the production of thematic maps to enable people to obtain quicker presentations of the subjects with which they were concerned. The remainder of this article will describe the system and its use.

Linmap system

The Linmap system uses co-ordinate references to locate points and boundaries. In Great Britain the Ordnance Survey's National Grid provides a ready-made system by which any position in Great Britain may be located to a resolution of one metre.

SCALE 1:450000 (7.1 MILES TO 1 INCH)

UNSKILLED WORKERS IN GREATER LONDON 1971

PERCENTAGE OF ECONOMICALLY ACTIVE AND RETIRED MALES
IN SOCIO-ECONOMIC GROUP 11

Based on 1971 Census data for enumeration districts

Figure 1

Any quantitative data can be prepared for use by Linmap provided a point at the centre of each area for which data are available is given a co-ordinate reference. Computer programs are used, to add a co-ordinate reference to the data and produce a magnetic tape in a form suitable for use by the mapping programs. It can be used repeatedly for map production.

Co-ordinates representing the boundaries of areas to be mapped are also stored on magnetic tape with an identifying code attached, so that they may be called on demand by the Linmap system.

Data and boundaries are used by the mapping programs to produce the output that the user requires.

Products of the system

The system can produce maps, summary statistics, frequency distributions and tabulations.

Maps

Three types of map can be obtained:

(1) *Linmaps* are black and white maps produced on a standard lineprinter. They are by far the cheapest, but also the least pleasing output. They are likely to be the quickest to produce and suitable for research work or pre-processing of data rather than for inclusion in reports or for wide circulation.

(2) *Greyscale maps* are black and white maps suitable for reproduction. Printing material for these maps is produced by a phototypesetting machine using specially designed characters to produce tones of grey. The maps are visually more acceptable than Linmaps, but take longer to produce. The difficulties of achieving a recognizable range of tones make these maps somewhat less readable than coloured maps, but they are cheaper to produce and print than coloured maps. *Figures 1*, *2* and *3* are examples of Greyscale maps.

(3) *Colmaps* are coloured maps which are relatively simple to interpret and suitable for large-scale circulation or publication. The maps are printed from material produced by a phototypesetting machine.

For each map type the user has a choice of four styles of presentation:

(1) *Dotmap* prints a character (lineprinter or phototypesetter) for each areal unit on the map. At small scales, when two or more areal units are covered by a single symbol, the data are combined and one character is printed. At large scales a single symbol does not fill the entire area of the unit and blank spaces appear on the map. Dotmaps are particularly suitable for research work as they are not, perhaps, easy for the non-expert to read. *Figure 1* is an example of a Dotmap showing the proportion of unskilled workers in Greater London in 1971. The darker tones show the concentration of unskilled workers in eastern London and along the banks of the River Thames.

OVERCROWDING 1971
PERCENTAGE OF HOUSEHOLDS WITH OVER 1.5 PERSONS PER ROOM
BY 12 KILOMETRE GRID SQUARES

Based on 1971 Census data for wards and parishes

Figure 2

(2) *Gridmap* aggregates the data occurring within squares, the size of which is specified by the user, and prints out the appropriate symbol over the whole square. *Figure 2* is a Gridmap of England and Wales, giving a generalized picture of the distribution of overcrowding.
(3) *Zonemap* aggregates the data into zones (e.g. administrative areas or traffic zones) and prints the appropriate symbol over the whole of each zone. *Figure 3* overleaf is a Greyscale Zonemap showing the distribution of population in north-western England.
(4) *Potential map* aggregates data within a series of circles of a radius specified by the user. The circles may overlap, so information for the same area may contribute to the value calculated for more than one circle.

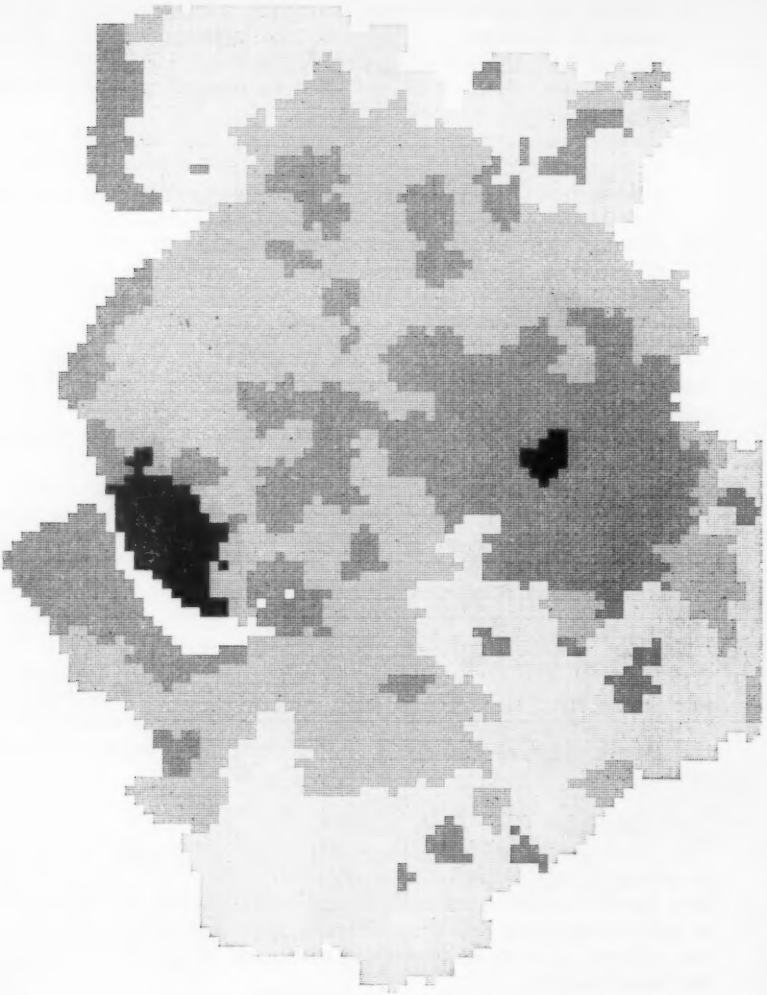
This type of analysis can be used to answer such questions as 'How many people live within X kilometres of a number of points?' The user may also specify a function to be applied to the distance of each centroid from the locations they contribute to, thereby modifying the value of their contribution.

The user may ask the system to calculate figures for circles with centres spaced at regular intervals over the map or, alternatively, he may specify the location of the centres of up to 60 circles of interest. In this case each location may have a different circle of interest and, while the distance function must be the same, each location may have a 'weighting factor' specified by the user. If a map is requested, this version of potential map looks like a Dotmap with very few centroids. The map, however, is useful to show where the specified locations were, in conjunction with a table giving a comprehensive listing of all values computed for all positions. This type of analysis may be used to indicate the likely level of interaction of a point with places in the surrounding circle.

Statistical output

The Linmap system can produce statistics relating either to the source data which are used or to dots, grids, zones or circles. The user, therefore, has the facility to examine the statistics of the subject he is interested in both at aggregate and discrete levels, although, naturally, when both are ordered the cost of processing increases. There are three types of statistical output:

(1) *Summary information.* The following statistics can be calculated:
  (*a*) Mean.
  (*b*) Median.
  (*c*) Mode.
  (*d*) Range.
  (*e*) Variance.
  (*f*) Standard deviation.
  (*g*) Coefficient of variation.



PERSONS PER HECTARE
NORTH WEST ECONOMIC PLANNING REGION
By Local Authority 1971

BASED ON THE 1971 CENSUS

Figure 3

(2) *Frequency distribution.* The system can produce four types of frequency distribution:

(*a*) Simple frequency distribution.
(*b*) Logarithmic (base 10) frequency distribution.
(*c*) Cumulative frequency distribution.
(*d*) Frequency distribution showing the value in each class as a percentage of the total value.

The distributions can be used to determine a rational set of values for the class intervals to be used for mapping.

(3) *Tabulations.* The system can produce 12 different tabulations at various levels of detail. The tables are lists of the data used, or values arrived at, during processing. Details of each table are given at *Appendix A.*

Facilities of the Linmap system

Linmap was designed to meet the needs of a wide range of users and provides them with a great deal of choice. In addition to choosing the type and style of map and the type of statistical output, users have the opportunity to specify in detail the area to be mapped, complex data processing requirements and details of the output which they wish to receive. The examples below are intended to give an indication of the range of facilities available.

Area to be mapped. The system can be applied to any territory. Once the boundaries of an area have been prepared for use with the system they can be used repeatedly to produce maps at any scale. In addition, maps of any rectangular or circular area can be prepared.

Data processing. In the calculation of the final value for mapping the user can perform complex calculations on up to 50 data items. The system can add, subtract, multiply, divide, work out logarithms, apply constants and calculate the value of one number to the power of another.

It is possible to restrict the number of areas included in calculations by applying a 'condition' or 'constraint' to the basic data. For example, 'If the total population of an area is above 1,000, include the area in further calculations'. Conditions may be applied to the data to be mapped or tabulated, or to other data items. For example, 'If the proportion of households with no car is more than 10 per cent, map the proportion of households with no car' or 'If the population density is more than 0·5 persons per acre, map the proportion of households with no car'.

The system can process two sets of data simultaneously. The two data sets can be of the same statistical series but collected at different times, or from different sources but both collected at about the same time. The system, however, requires 1 to 1 parity between the two sets of data. The records on them must relate to the same data collection units or aggregation areas, be in the same order and have the same co-ordinate references.

Information produced by the system during a run may be saved for future use by Linmap or by other programs.

Presentation of output

The values to be mapped are normally divided into a number of groups or classes. These are represented by a range of tones which distinguish up to 10 classes. The user can choose the number of classes, the way in which the values are grouped, and the way in which the information for each class is shown on the map.

Values may be grouped in three ways. When the distribution of values to be mapped is known the user can specify the values he wishes the class intervals to take. Alternatively, when the distribution of values is suitable, the system can be asked to choose class intervals at 'equal intervals', i.e. divide the range of values by the number of classes chosen. When the distribution of values is not known the 'equal occurrence' option, which places an equal number of dots, squares or zones in each class, may be used.

To map values which fall above, below or within a certain range the user may specify an upper and lower limit on the values to be mapped. For example, 'map total population divided by hectares where the number of persons per hectare for any dot, square, zone or circle is greater than 0·25 but less than 1·00'. Values which fall outside these limits (called thresholds) are shown on the map by special symbols.

The system offers the user a wide range of choice on details of presentation.

For Greyscale maps and Colmaps the user can, within the limits of the hardware, specify the size of characters required to make up the map. They may also specify the size, case and layout of type to be used for the title and footnotes.

The tones used to represent each class may be controlled by the user, although 'standard' ranges are available for those who do not wish to make this choice. With Linmap the user may specify up to 10 lineprinter characters to be overprinted to represent each class. With Greyscale maps there are three ranges of special characters from which the user may choose and with Colmap the user may specify the number of pieces of printing material to be produced, and state which classes should be shown on each piece.

Present Linmap programs and their use

The Linmap programs which are in use at present are installed on the Department of the Environment's ICL 1904S computer at Hastings. Some systems details are given at *Appendix B*. The programs may be used, on a bureau basis, by any central Government Department or local authority in the United Kingdom. The system may also be purchased from the Department of the Environment. (Interested departments and authorities should contact Mrs. G. Hackman, PI3, Department of the Environment, Prince Consort House, Albert Embankment, London SE1 7TF.)

At present the bureau service operated by the Department is producing about 1,000 maps each year. Users have only to specify the subject and area of interest, as they would when requesting a conventional map, and this is converted to a series of standardized control statements which enable the computer to produce a map.

The Department holds the 1971 and 1966 Population Censuses of Great Britain and the 1969 Agricultural Census of England and Wales in a form suitable for use by the Linmap system. The coastlines of Great Britain and England and Wales, and the boundaries of the Economic Planning Regions and Greater London have been prepared for use with the system. Local authority and county boundaries for Great Britain, as they were in 1971, are almost ready for use, and the 1974 local authority boundaries of England and Wales and 1971 ward and parish boundaries of Great Britain are being prepared.

The use of Linmap—some examples

Linmaps have proved useful at the local, regional and national levels although particularly wide use is made of lineprinter maps of local areas.

An example of the use of Linmaps at the local, or city planning, level was in a recent study of the main urban areas of England and Wales to identify areas of housing stress. About 100 lineprinter maps showing indicators of housing stress (e.g. overcrowding) were produced at a scale of 1:25000 using 1971 Census data for enumeration districts. The maps were used to provide guidelines for defining potential Clearance Areas, Housing Action Areas and General Improvement Areas. The use of Linmap made it possible to examine a much wider range of variables, in much greater detail, than would have been possible in the time available had manual methods been employed.

The Countryside Commission has made considerable use of the system at the sub-regional level in rural areas. A large number of Gridmaps, using 1971 Census enumeration district data, have been prepared covering the National Parks of England and Wales to give a picture of the socio-economic situation within these areas. The Commission has also used the potential mapping option and car ownership figures from the 1971 Census to help estimate the potential number of visitors to several country parks.

At the regional level a variety of Linmaps using 1971 Census ward and parish data were used to help in the preparation of strategic plans for both East Anglia and the North. At this level Greyscale maps have also been produced for inclusion in reports.

A number of maps have been produced at the national level. These were mainly maps for display purposes, providing a broad picture of the spatial distribution of data. For example, a coloured map of Great Britain showing population density appeared in *Britain 1975, an Official Handbook*, published by Her Majesty's Stationery Office and seven Greyscale maps of Wales showing the percentage of persons in different

types of employment were published in *Welsh Economic Trends No. 2, 1975*.

Benefits of Linmap

It is impossible to make a quantitative estimate of the benefits of Linmap as Linmaps are not directly comparable with conventionally produced maps and they frequently serve a different purpose. Conventional maps are generally made for illustrative purposes and their presentation is an important aspect. Computer maps are frequently made as part of the research process, and only a small proportion are finally used to illustrate results and are, therefore, directly comparable with conventional maps. Nor should the cost of producing a computer map for illustrative purposes be directly compared with that for producing a conventional map, as Linmaps, at present, tend to have a lower standard of cartographic excellence than maps produced conventionally.

A fairer idea of the value of Linmap may be obtained by summarizing the benefits it brings to its users.

The main advantage of Linmap is that it enables planners, administrators and others without any specialist knowledge, to obtain, quickly, summary maps and tables from a large data bank. The majority of Linmaps could not have been produced in a reasonable period of time using conventional statistical analyses and mapping techniques because of the sheer quantity of data involved.

The ability to produce maps quickly, cheaply and at any scale means that Linmap is of particular value to the research worker. Linmap in the form of computer print-out enables the research worker to make a rapid examination of the areal distribution of any of the information in the Linmap data bank. If a map does not make the most appropriate use of the data it can be rejected and quickly replaced by another produced to a different specification.

Maps for reproduction can also be produced more quickly and at lower cost, but with a lower cartographic excellence than conventionally produced maps. Using the graphics available with Linmap, the system can produce printing material ready for the printer. This means that coloured maps up to 11 in. wide require no drawing office work. To produce maps more than 11 in. wide the drawing office has only to join two strips of film together. This is particularly important at a time when the costs of cartographic draughtsmen are increasing.

The future

Linmap has been demonstrating its capabilities for over six years but the system is still evolving, to meet the needs of users and save time and money within the computer installation and drawing office.

Editor's note. A list of relevant papers on the Linmap system is at page 179.

Linmap Tabulations

Table 1 Summary totals referring to the whole of the area.

Table 2 Information for each dot, square or zone mapped. When potential is being mapped the information in this table refers to the totals for each circle under consideration. The order of printing is west to east from north to south.

Table 3 As table 2, but the order of printing is from the smallest to the largest finally mapped value.

Table 4 Information for each areal unit. The table includes information for those areas that fall within the area being mapped and which satisfy any inclusion conditions that were specified. The table cannot be produced when potential is being calculated. The order of printing is west to east from north to south.

Table 5 As table 4, but the order of printing is from the smallest to the largest finally mapped value.

Table 6 As table 4, but the order of printing is all areal units included within each dot, square or zone, followed by the total for that dot, square or zone.

Table 7 Lists all areal units outside the boundary of the area being mapped.

Table 8 Lists all areal units which are inside the boundary of the area being mapped, but are excluded from the map itself by inclusion conditions. The table states why each unit was excluded. This table is not recommended when calculating potential, as each areal unit will be considered for each circle in which it is included and could appear in the table many times.

Table 9 Lists the areal units whose final values fall outside any thresholds specified. The table is not available for potential maps.

Table 10 Lists all dots, squares and zones whose final values are excluded from the map by any thresholds specified.

Table 11 The table is subdivided into classes. It lists all areal units inside the area being mapped which satisfy any inclusion conditions specified. The order of printing is from the smallest to the largest finally mapped value.

Table 12 As table 11, but the table refers to dots, squares and zones.

Systems information

The Linmap 2C system comprises the following program suites:

(*a*) *Boundary Preparation Suite* (BPS). A set of programs to process digitized boundary information into a format acceptable to the Linmap mapping programs.

(*b*) *Points Data Preparation Suite* (PDPS). A small suite of programs which can be used to add grid co-ordinates to survey/statistical data already structured in Linmap acceptable format.

(*c*) *Mapping Suite* (MS). Programs for the production of maps, graphs and tables.

The programs are written in PLAN with some FORTRAN subroutines. They were designed to operate on a 1900 series ICL computer with George III operating system, and require floating point hardware for efficient running. The programs have been adapted and optimized to work on the Department's ICL 1904S computer.

The system documentation includes:

(*a*) A listing of the programs described above.

(*b*) Program documentation for each of the three suites of programs.

(*c*) User manuals for each of the three suites of programs.

(*d*) System maintenance manual.

(*e*) System generation manual.

The system's standard hardware requirements are as follows:

	PDPS	*BPS*	*MS*
CORE	13K words	32K words	32K words
Lineprinter (160 characters)	1	1	1
Exchangeable disc drive (BPS 30)	1	—	1
Card reader	1	1	1
Paper tape reader	1	1	—
Magnetic tape decks (9-track 80 characters per second)	3	3	up to 6
Magnetic tape decks (7-track 80 characters per second)	—	—	1
Graph plotter	—	1	—

Core sizes indicate the maximum size of the largest program in the respective suites.

The total size of the object programs is:

PDPS 39K words + Standard ICL sort and merge routines.
BPS 319K words } + 46 macro instructions occupying up to 512
MS 250K words } words each.

For the production of Greyscale maps and Colmaps the programs produce a magnetic tape which is used to drive a phototypesetting machine. The machine used by DOE is a Linotron 505 phototypesetter which produces printing material on photographic film 11½ in. wide.

Management Bookshelf

Mrs. B. M. HOWARD, Civil Service Department

All the books mentioned below are on display in the CSD Central Management Library for the two weeks following publication of this journal. Thereafter they may be inspected by staff in Departments at any time, but a preliminary telephone call is recommended (01-273 5788) to ensure that the titles you are seeking will be available at the time of your visit. The books are not available for direct loan from CSD: enquiries should be directed to your local library or to any bookshop. —*Editor.*

'Late at the office, Home, with my mind full of business, and so to bed.' Samuel Pepys' diary for 10th April 1662 concludes in a way that strikes a very familiar note. Sir Philip Allen used that quotation to round off a survey of the Civil Service since the Second World War, and wondered if things had really changed so much in the last 300 years. His comments form one chapter in a review of *The Modernization of British Government*, edited by William Thornhill (1975, Pitman, £9·25, 322 pages), in which a distinguished group of experts examine administrative changes over the last 25 years in the parliamentary system, the machinery of government, the redress of grievances, nationalized industries and local government.

The present-day system of public administration is discussed in *Administering Britain* (1976, Collins/Fontana, £1·95, 288 pages) by two academics, Brian Smith (who was seconded to the Civil Service College from 1970 to 1972) and Jeffrey Stanyer. They present their analysis in terms of the issues which they see as basic: decentralization; public organization; the public service; and control of administration. They insist that public administration can only be appreciated in terms of its inter-relationship with the whole political system and the wider society in which it is located.

Various techniques can be used to assess the factors in administrative decision-making. The Canadian Treasury Board has issued a booklet describing one such, *Benefit-Cost Analysis Guide* (1976, Information Canada, Ottawa, $3·00, 80 pages). This methodology has been used extensively in Canada following the introduction there of PPBS (Planning-Programming-Budgeting System) in 1967. (British nomenclature, of course, puts the cost before the benefit—perhaps significantly.)

A cost which is often ignored is that of time. Two brief BIM publications analyse ways in which it is spent (or wasted) and discuss how this information can be utilized to increase efficiency. These are *Managing Your Own Time:* Guidelines for the Smaller Business, No. 13 (1975, 10p, single copies free to collective subscribers and individual members, four pages) and *Working Day of a Manager in Local Government:* Management Information Sheet No. 53 (1976, 25p to collective subscribers, 50p to non-members, four pages). Many local government officers in administrative and professional departments find that much of their time is taken up with the personnel function—through prob-

lems of morale, productivity or industrial relations. A new publication of the Institute of Personnel Management explores staffing policies in local government offices and compares them with other types of organization. *Personnel Management in Local Government* by Alan Fowler (1975, IPM, £2·50, 315 pages) is a useful paperback covering many aspects and will be of interest both to the PM specialist and to the generalist. In these times of change and urgency, the manager can no longer assume that his staff are not interested in what is happening. (If they are indifferent, perhaps it is his fault anyway.) Briefing them, face to face, on a regular basis, is a very good way of achieving interest and commitment. A notebook from the Industrial Society provides help for administrators who want to improve their powers of communication. *A Pocket Guide to Briefing Groups* (1975, 50p, 14 pages) is the right size and shape for quick reference; it includes examples of briefing subjects and a 'management briefing form'.

'People in offices' is the longest and, in the author's opinion, perhaps the most important, section in *Office Administration Handbook* by B. H. Walley. (This is based on his earlier *Manual of Office Administration.*) In this his latest work he chronicles the advance of behavioural theory, the changing role of supervisor and manager, gaining an acceptable rate of change, industrial relations in the office—all of considerable relevance to solving office problems. Other important sections deal with the office environment, improving performance, equipment, and control (1975, Business Books, £8·50, 470 pages). One aspect of business which is becoming increasingly important is, of course, the computer, which having lost much of its glamour is being accepted more realistically as part of the office scene. This is due in no small part to the advent of the 'mini', which has brought the advantages of computer power to a wide range of users who previously would not have considered such mechanization feasible. But there are snags to its low cost and versatility, and too hasty a decision may lead to the choice of a costly or inefficient system. A useful, non-technical introduction to *Minicomputers* has been written by Peter Sanderson, Senior Advisory Officer (Computers) at LAMSAC (Newnes-Butterworth, 1976, £3·50, 111 pages). It illustrates some of the possible pitfalls as well as some of the benefits; it gives guidance on selection of a mini and on the maximization of its potential. No detailed knowledge of electronics or programming languages is required, nor is there emphasis on any particular application.

There are, of course, cheaper alternatives to a computer for 'number crunching'. These include pocket calculators, getting cheaper month by month, and slide rules. There are a variety of guides to these tools and it may be useful to mention two inexpensive vade-mecums. These are *The Sinclair Book of Management Calculations:* a step-by-step guide to the use of the electronic calculator in business (1973, Woodhead-Faulkner, in association with Sinclair Radionics, 50p, 96 pages) and, in the well-known Teach Yourself series, *The Slide Rule* by Burns Snodgrass (1971, 45p, 179 pages).

'It is a widely held belief that operational research is an abstruse branch of higher mathematics and that only wranglers can hope to appreciate it,' says P. G. Moore in the opening chapter of the second edition of his *Basic Operational Research* (1976, Pitman, £3·75, 203 pages). But the emphasis in this book is upon the problem, the way it is tackled and the interpretation of the solution, rather than upon the mathematical techniques needed to arrive there. There are numerous case histories and this edition includes considerable discussions on forecasting and decision analysis. It is intended both for the manager and as an introduction for the serious student of OR.

A selection of new and established *Books for Business Executives and Business Students* has been issued as a six-page folder by the Booksellers Mail Order Centre, Well House, Ewhurst Road, Cranleigh, Surrey; copies may also be found in many bookshops. This is the ninth annual edition of a free, annotated guide to titles from 35 publishers.

Job Appraisal Reviews Three Years On (Page 134–143)
Heads of Establishments, Training or Management Services divisions who would like copies of the following reports on JARs can obtain them by ringing BSRD on 01-273 4132. Any other applications for copies should be made to Room 4/5, BSRD, Civil Service Department, Old Admiralty Building, Whitehall, London SW1A 2AZ.

No. 12 An evaluation of the JAR Scheme as it operates in the Welsh Office. C. A. Fletcher. (A Technical Annex, No. 12A, is also available.)

No. 20 Job Appraisal Reviews in the Civil Service Department: An evaluation study. C. A. Fletcher.

No. 28 An exploratory study of Job Appraisal Reviews at junior levels. C. A. Fletcher and R. S. Williams.

No. 32 Job Appraisal Reviews in HMSO: An evaluation including a before-and-after study. S. V. Dulewicz.

No. 33 An appraisal of appraisals: JAR evaluation study in the Property Services Agency of DOE. C. A. Fletcher.

The Linmap Computer Mapping System (Pages 165–176)
Readers who wish to learn more about the system should consult the following:

Gaits, G. M. Thematic mapping by computer, *Cartographic Journal*, June 1969.

Hackman, G. A. and Willatts, E. C. Linmap and Colmap: an automated thematic cartographic technique, 1972.

DOE Linmap information note No. 1, 1971 Census Maps, 1973.

DOE Linmap information note No. 2, The new Linmap system, 1973.

DOE Linmap information note No. 3, Ordering a Linmap, Revised 1973.

DOE 1971 Census small area statistics and their Linmap codes, Part 1, 100 per cent data, 1973.

DOE 1971 Census small area statistics and their Linmap codes, Part 2, 10 per cent data, 1973.

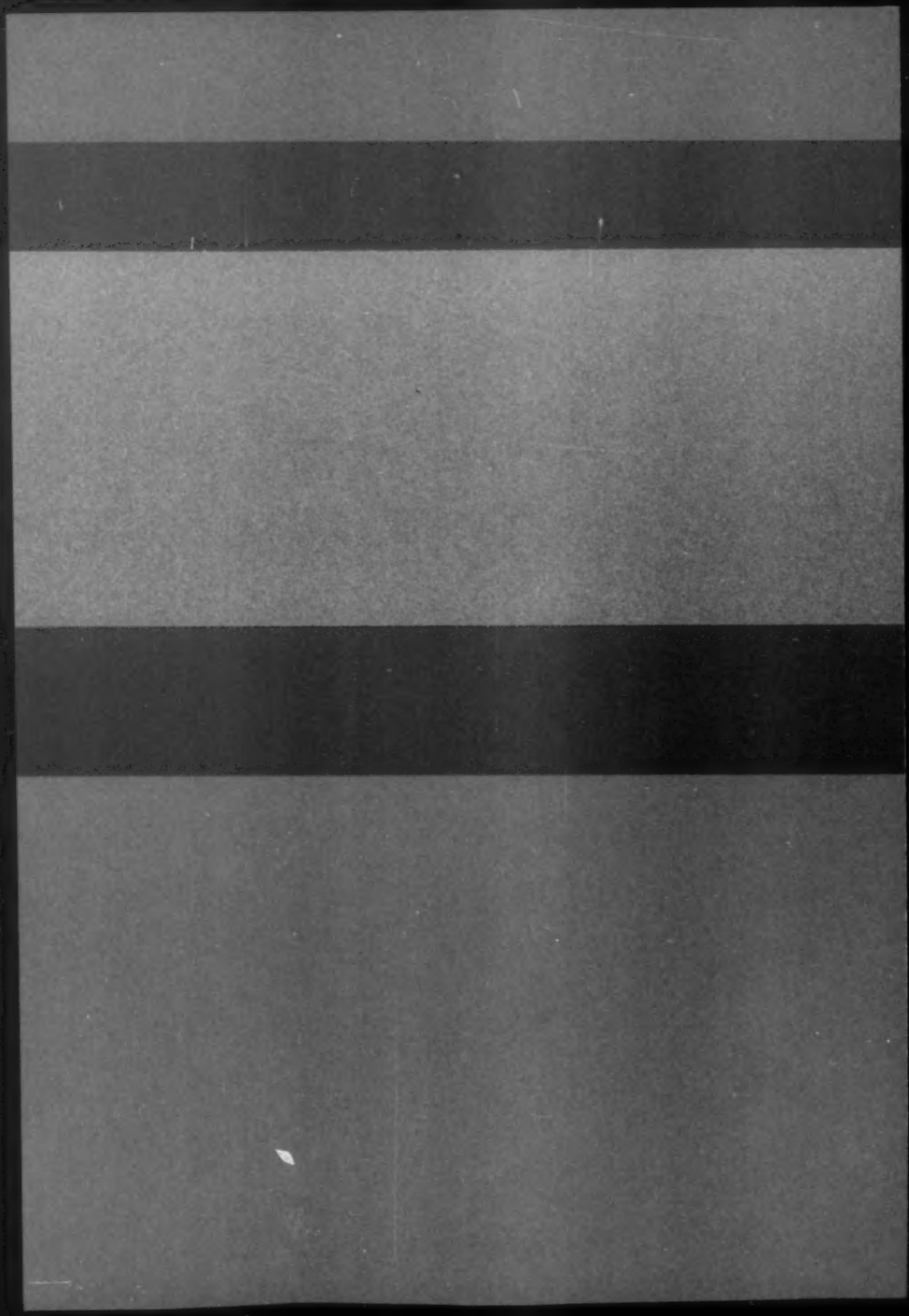
DOE Lists of data available for mapping from: 1966 Sample census; 1969 MAFF June returns; 1971 Rating data.

Copies of all papers, except that by G. M. Gaits, may be obtained from the Department of the Environment, Room 706, Prince Consort House, Albert Embankment, London SE1 7TF.

Computer Installations for Government Departments

A list of all Government computers as at 1st January 1976 was published as a supplement to the May 1976 edition of MANAGEMENT SERVICES IN GOVERNMENT. Details of computers ordered during the period 1st January to 31st March 1976 are shown in the following table.

DATE OF ORDER	DEPARTMENT[1]	LOCATION	MAIN USES	MANUFACTURER[2] AND TYPE OF COMPUTER
1B Computers on order for administrative and general purposes				
January 1976	DHSS	Livingstone	Short-term Supplementary Benefits	ICL 1904S
January 1976	DHSS	Reading	Short-term Supplementary Benefits	ICL 1904S
March 1976	Cabinet Office/Treasury	London	Econometric modelling, statistical research and progress development	Univac 1106
March 1976	Home Office and Met. Police	London	Pay and statistics	Two ICL 1904S
March 1976	MOD (PE)	Nottingham	Production control, payrolls, etc.	ICL 2903
2B Computers on order for scientific and technical purposes				
January 1976	Home Office	Staffordshire	Police command and control system	Ferranti 700
January 1976	Home Office	Staffordshire	Police command and control system	Ferranti 700T
January 1976	DE	Sheffield	Safety in mines research	RX Sigma 6
January 1976	MOD (PE)	Bedford	Flight simulation	RX Sigma 8
January 1976	DI	London	Instrument data logging and information retrieval in Laboratory of Government Chemist	RX 530
January 1976	DE	Sheffield	Safety in mines research	RX 530
February 1976	MOD (Air)	Locking	Electrical Technicians training	Prime 300
February 1976	MOD (PE)	Pyestock	Engine testing	DEC PDP 11/40
February 1976	MOD (PE)	Farnborough	Research and development	DEC PDP 11/45
February 1976	MOD (PE)	Westcott	Scientific application	DEC PDP 11/20

[1, 2] Refer to supplement to May edition for Department and Manufacturer keys.

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